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STERILITY IN THE MALE AND FEMALE

AND ITS TREATMENT

STERILITY IN THE MALE AND FEMALE

AND ITS TREATMENT

BY

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THIS BOOK
IS DEDICATED
TO THE MEMORY OF
MY PARENTS

EDWARD AND MINNA HÜHNER

AS A TOKEN OF MY AFFECTION

PREFACE

THIS work is the result of many years of original research and experimentation in the study of sterility in the male and female. The material has been gathered from the genito-urinary clinics of the Harlem Hospital and Bellevue Hospital dispensaries, and also and mainly from the gynecological clinic of Mount Sinai Hospital Dispensary, where, for a period of over six years, every case of sterility, coming in one of the afternoon classes, was referred to me for study and investigation. I had the patients ordered to my office at various periods after coitus, and different portions of the genital tract were investigated to determine how far, at various periods after coitus, spermatozoa penetrate in normal and in pathological cases, and what is the effect on the vitality of spermatozoa of various kinds of douches, catarrhal secretions, inflammations of various portions of the genitalia, etc. Condom specimens were examined and various experiments were made to determine the effect on living spermatozoa of gonococci, prostatic fluid, various chemicals, etc.

An original method is suggested herein for studying the progress of spermatozoa in the tubes

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in various normal and pathological conditions, of which we at present know very little except what we can infer from experiments on lower animals, and from a few accidental medico-legal cases. An original method of treatment is also described, which is at present still in the experimental stage, for those almost hopeless cases of azoöspermia due to a previous double epididymitis. I have also gone into the clinical histories of the cases to determine what effect heredity, stature, age, and other factors have upon the production of sterility.

Although the bibliography, which will be found near the end of this book, is quite large, the literature upon the subject of the behavior of spermatozoa within the female genitals is very meagre. As late as June, 1910, *Natanson* and *Königstein*[49] state in the Wiener Klinische Wochenschrift that up to the time of their writing only two authors (*Haussmann* and *Runge*) have made observations along these lines. *Haussmann's* observations are very interesting in view of the fact that they have been made so long ago as 1879, but his observations are too few in number; while *Runge's*[62] observations, though somewhat more numerous, were only made upon one particular point, namely, the influence of EFFLUVIUM SEMINIS upon the presence of spermatozoa in the genitals of the female, but no attempt at a systematic investigation of spermatozoa was attempted. *Natanson* and *Königstein* in 1910 also made some

observations upon spermatozoa in the female genitals, but these also were made only in one direction, namely, to contradict *Runge's* theory.

It is true that we find a few accidental observations on the subject in medical literature. *Percy*,[82] for instance, way back in 1861, accidentally discovered live spermatozoa in the cervix of the female eight and one-half days after coitus, and *Sims*, many years ago, pointed out the advantage of looking for spermatozoa in the female genitals rather than in the condom; but I believe, from a search of English and German literature, that this book is the first attempt since *Haussmann's* few observations to make a SYSTEMATIC study of the behavior of spermatozoa in the female genitals. As will be seen from my list of examinations and experiments, I have made 475 examinations for spermatozoa, consisting of the examinations of 205 condom specimens, 216 examinations of various parts of the female genitals for spermatozoa, 28 aspirations of the testicles and the examinations of the aspirated testicular fluid for spermatozoa in cases of azoöspermia, and finally 26 aspirations of testicles in non-sterility cases. The latter were made in order to get some idea how often spermatozoa can be found in the aspirated testicular fluid in non-sterile cases, as no such data could be found by me in a search through medical literature.

From all these investigations I have drawn certain PRACTICAL conclusions, and have outlined a method of treatment of sterility in the male and

female based upon scientific investigations. I have not deemed it necessary to describe the various operations for sterility, as these may be found in any of our standard text-books, many of which appear in the bibliography in the latter part of this volume. I have rather thought it advisable to limit this work as far as possible to my own investigations, and to record facts that cannot be found elsewhere, than to burden its pages with detail which can be easily found in text-books on gynecology or other sources of medical literature.

The object of this book is twofold. In the first place, it will present the results of original work and study on the subject of sterility, pointing out at the same time certain errors which have been copied from one text-book into another without investigation or challenge; and in the second place, it will present a PRACTICAL method of the treatment of sterility in the male and female based upon scientific investigation and accurate PRE-OPERATIVE diagnosis.

The method of procedure in cases of sterility employed heretofore has been far from accurate, even in the hands of the most up-to-date physicians. It may be summarized as follows: A condom specimen of the husband's semen is examined, and if found normal, the wife is examined for any abnormality of the genitals. In case an anteflexion and stenosis is discovered, the woman is subjected to a curettage and dilatation, and one of the operations on the cervix which the physician may prefer.

If this is not successful, she may have the operation repeated in part by the same or by another physician, and finally the operation of exploratory laparotomy might be suggested.

The method of procedure outlined above, which is the one generally followed, with the exception that the operative procedure varies with the abnormality discovered on examination, is probably the best that could have been followed heretofore. From the results of my experiments and study of many cases, however, I consider it far from ideal. In the first place I will show and will repeatedly emphasize the fact that the mere finding of live normal spermatozoa in the CONDOM does not by any means absolve the husband from being the cause of the sterile wedlock. But even should it be proven that the husband is absolutely normal in this regard (and I will explain how this can be definitely determined), the operator still does not know that the particular abnormality discovered in the female is the cause of the sterility, or that the relief of such abnormality will cure his patient. In other words, he is working entirely in the dark. It is exactly on this account that this book has been written. It will attempt to show how a PRE-OPERATIVE diagnosis of the cause of the sterility may be determined in many cases, and the method of procedure has been so simplified as to bring it within the reach of the average physician.

In conclusion, the writer acknowledges with pleasure his indebtedness to *Dr. Hiram Vineberg*

and to *Dr. Sol. Wiener,* both of Mount Sinai Hospital Dispensary, for permitting him the use of their extensive material for a systematic study of the subject.

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STERILITY IN THE MALE AND FEMALE

AND ITS TREATMENT

CHAPTER I

General Considerations About Sterility—Where Man's Responsibility Ends—Importance of Cervix Test for Sterility—Errors Made in Regard to Man's Responsibility—Objections to Condom Method for Fixing Man's Responsibility—Errors Made in Fixing the Woman's Responsibility—Practical Value of Cervix Test.

When we speak about sterility practically, and for therapeutic purposes, we mean those cases where both parties desire to have children. When we speak of curing a case of sterility, we mean, for all practical purposes, that some impediment to impregnation has been discovered and been relieved. We all know that impregnation sometimes takes place under the most unfavorable conditions, that it often takes place when both parties have done everything possible to *prevent* pregnancy, yet these facts should not mislead us in the therapy of sterility. Let us take a simple and not very rare example. A couple are married several years and have no children. On examination everything is found normal except an almost imperforate hymen. We remove the hymen and impregnation follows in a short while. We may call this a case of cure

of sterility, although we know that impregnation has in rare cases taken place in the presence of a pinhole opening in the hymen. The same may be said about all the other impediments to impregnation.

As a general rule, as far as the male is concerned, in order that impregnation shall take place, live spermatozoa must be ejaculated from the penis on to the cervical os of the female uterus. This seems to be a very simple and plain statement, yet it is of prime importance and not fully appreciated even by some gynecologists. I also make this statement despite the fact that in rare instances impregnation has followed the mere deposit of spermatozoa upon the *external* genitals of the female without any intromission whatsoever. As already stated, these cases are exceptions and have no bearing whatever upon the practical treatment of sterility.

To repeat therefore, as long as the male's spermatozoa reach the cervical os, in a normal condition, the husband is absolved from all responsibility as far as the sterility is concerned. I will go even further and say that this is the *only* absolute test that the male is normal. It cannot be emphasized too emphatically that the finding of signs of an old single or double epididymitis, of hypospadias, of epispadias, of stricture of the urethra, latent gonorrhea or even acute gonorrhea, does not of itself mean that the male is sterile. In spite of an old epididymitis the canal may still be patent, in spite

of a urethral stricture the semen may still be ejaculated with sufficient force to reach the cervix. The cervix may also be placed in such a position that it catches the semen from a penis afflicted with either hypospadias or epispadias, and pregnancy has also occurred in the face of an active gonorrhea. I cannot emphasize too emphatically the importance of this test, particularly as one prominent gynecologist [10] in a very able paper on the subject states that, without further investigation, he laid the blame on the husband because he found evidences of old epididymitis, not thinking it necessary in such cases to examine the husband's semen. Other physicians have told me that if they find shreds in the urine of the male, they do not think it necessary to look further.

The importance of the simple test given above in fixing man's responsibility in sterility cannot be overestimated. I desire right here to protest most emphatically against a method which is almost universally in vogue for determining responsibility in sterility in any particular case, and that is, the placing of the decision upon the presence or absence of live spermatozoa found in the condom after connection. This test is not at all reliable, except in a negative sense. If spermatozoa are always *absent* in the semen found in the condom, we can say that the sterility is due to the male; but if found present and alive, even in large numbers, we cannot, *on this evidence alone,* absolve the husband from responsibility. The husband may be suffer-

ing from a marked hypospadias or epispadias, in which case the condom specimen would be filled with normal spermatozoa, but on account of the abnormal position of the meatus (unless the cervix be also placed in a peculiar position), the stream of semen is directed away from the genital orifice of the female or even, in particularly bad cases, may not be ejaculated into the vulva at all, but entirely outside the genitals. He may be suffering from premature emissions, where in very bad cases the ejaculation takes place before the penis has a chance to enter the vagina, and still, in such a case again, the condom specimen might be all that can be desired. In certain cases of stricture of the urethra, the seminal fluid is not at all ejaculated, but dribbles out *after* coitus when the penis resumes the flaccid condition, and here again the condom would show normal spermatozoa. I do not wish to say, however, that in every case of stricture or of epispadias, etc., these conditions prevail, and in the preceding paragraph I have, therefore, distinctly emphasized that the mere finding of such conditions must not, without further investigation, be considered as proof that the man is responsible for the sterility; but on the other hand we must not absolve the man because the condom shows normal live spermatozoa.

Similarly in the female (and it is here that most sins are committed) the mere finding of an anteflexion, or a retroflexion, conical cervix, etc., is not of itself sufficient evidence to blame her for the

sterility; for at the same time the husband may be suffering from any of the abnormalities of the sexual organs above mentioned or he may not have any spermatozoa at all. In any of these cases any operation upon the female organs would be absolutely useless as far as sterility is concerned.

That this cervix test (as I will call this test for the sake of brevity) is not merely of theoretical interest will be shown later on when giving the statistics of man's responsibility for sterility. It will there be shown not only that the difference in the statistics as obtained from the use of this test as compared with those obtained by the condom test, is large enough to make it of prime importance; but also that it is its very simplicity which makes it of such great *practical* value. Of course, the technique will be fully described later on, but for the present I wish to state that all that is necessary is for the woman to come after coitus, the sooner the better (although in many cases spermatozoa can be found many hours and even many days after coitus) and is placed in the regular gynecological position; a bivalve speculum is inserted, the cervix is seen, and with an ordinary platinum loop on a glass rod a particle of mucus from within the cervical os is placed on the glass slide and examined under the microscope. In normal cases we will at once see many live spermatozoa. This is all there is to it; yet what a wealth of information is obtained from this few minutes examination! We need not care whether the hus-

band has stricture, old epididymitis, hypospadias or what not, or whether, as many women complain, the husband is somewhat impotent as shown by premature ejaculation. In other words, we need not care what the condition of his sexual apparatus is, for we know at once that as far as impregnation is concerned his organs are satisfactory. Similarly we need not listen to the wife's complaint that *all* the semen runs out of her immediately after coitus, for we know that enough spermatozoa are in the cervical canal for purposes of impregnation.

I will not continue this argument any further for the present, as the subject will be fully elaborated later on, but enough has been said to show the great advantages of this test over the condom method.

Another advantage is that the husband need know nothing about the fact that he and his wife are being investigated for the cause of sterility. Moreover, we occasionally meet with men who cannot have connection at all when using a condom, and also with others who have religious scruples against using a condom. If spermatozoa are always absent from the genitals of the woman, especially if she is examined within a few hours after coitus, then, of course, it will be necessary to get a condom specimen and also to make further investigations.

To study the relationship of spermatozoa to sterility, we must first know the behavior of spermatozoa in the normal female genitalia before we can come to any conclusion whether, in any particu-

lar case of sterility, the male or the female is responsible for the condition. It need hardly be mentioned that a man may perform the sexual act, including ejaculation, perfectly normally and still be absolutely sterile.

CHAPTER II

Behavior of Spermatozoa in the Normal Vagina—Acidity of Vagina Detrimental to the Vitality of Spermatozoa—*Kehrer's* Theory; *Haussmann's* Observations—Author's Observations—Conclusions to be Drawn from the Behavior of Spermatozoa in the Vagina—Best Time to Have Coitus for Purposes of Impregnation—Statistics of Jewish Women.

If mucus from the vagina be examined within one hour after coitus, we will find many dead and also many live spermatozoa. Most of the spermatozoa lose their motility within 15 minutes after coitus, and almost all are dead one hour after coitus. After making very many examinations (see list of my own examinations at end of book), I have in very rare instances found live spermatozoa 2 hours after coitus, but in the vast majority of cases nothing but dead spermatozoa were found in the vagina after one hour. This is due to the fact that the vaginal secretion is acid, and this acidity is inimical to the life of the spermatozoon. *Kehrer* says that so much alkaline semen is expelled at coitus as to overcome the acidity of the vaginal mucus. I have in 100 consecutive cases tested the reaction of the vaginal mucus and have always found it *acid,* so that I cannot agree with *Kehrer.* I sup-

pose that under very exceptional circumstances a man may expel such an enormous amount of semen (as in a rare case mentioned by *Ultzmann*[71] and called by him polyspermia where the man at each nocturnal pollution lost such an enormous amount of semen that his drawers and bed were each time thoroughly wet through, and that after coitus the women declared he must have urinated, for they felt themselves so wet), as to overcome the normal acidity of the vagina, but I am certain that this is not the rule. I have very often found the vagina alkaline after the taking of an alkaline douche before coitus, but even this is not the rule, and I have also found in the vagina after coitus a mass of semen which was alkaline, although the rest of the vagina was acid, but this is also the exception.

Haussmann,[30] way back in 1879, made, I believe, the first observations in systematic order upon the behavior of spermatozoa in the female genitals. His observations, though correct, were made on a very small number of cases, and are as follows:

In 4 out of 5 cases no live spermatozoa were found in the vagina 12 hours after coitus.

In 6 cases, 15 hours after coitus, and although there were found masses of spermatozoa in the vagina, the reaction of the mucus was always acid and all the spermatozoa were dead.

No spermatozoa at all were found in the vagina of a pregnant woman 36 hours after coitus.

Haussmann also calls attention to a possible

source of error, namely the fact that live spermatozoa are sometimes expelled from the uterus with the menstrual blood and also with the catarrhal secretions of the uterus, a long time after coitus. Thus he found live spermatozoa in the vagina 38 hours after coitus; in this woman, however, menstruation had set in 12 hours after coitus, and as all spermatozoa in the vagina die long before this time, these lively ones must have been expelled with the menstrual blood. In another case live spermatozoa were found in the vagina a long time after coitus, in spite of vaginal douches of copper sulphate. Now, sulphate of copper kills spermatozoa, so that these must have been extruded with the uterine catarrhal secretions.

I have made these same observations also, except that I have investigated many more cases (see list at end of book) and can, therefore, agree with *Haussmann* that the vaginal secretion is and remains acid in spite of coitus, and that the vast majority of spermatozoa that remain in the vagina die between 15 minutes and one hour after coitus. I have, however, never seen live spermatozoa extruded from the uterus with the menstrual flow or with the catarrhal secretions a long time after coitus, so that we do not need to worry about these possible sources of error. On the other hand I have had opportunity to examine women during their menses, only in a very small number of cases, as in this country examinations during this time are impracticable to say the least. I have found

dead spermatozoa on the cervix on the first day of the menses, but cannot say that they were extruded with the menstrual blood as they would have been found there at that time even if menstruation had not set in.

I have made many more investigations than *Haussmann,* but as already stated, agree with him on the behavior of spermatozoa in the vagina. In many cases, simply for scientific reasons, I looked for spermatozoa in the vagina; but in the vast majority of cases I did not bother looking for them if the patients came long after coitus, because I knew it was useless. I have investigated 62 cases, and my results are as follows:

In 3 cases examined one hour after coitus, I have twice found live spermatozoa and in the other not any.

In 6 cases examined 2 hours after coitus, I have found dead spermatozoa 4 times and in 2 cases not any.

In 12 cases examined 3 hours after coitus, I have once found live spermatozoa (this is the longest time I have ever found live spermatozoa in the vagina), in 7 cases I found dead spermatozoa, and in 4 cases not any.

In 9 cases examined 4 hours after coitus, I found 3 times dead spermatozoa, and 6 times not any.

In 3 cases examined 5 hours after coitus, I have never found any.

In 3 cases examined 6 hours after coitus, I have found dead spermatozoa.

In 1 case examined 8 hours after coitus, I found dead spermatozoa.

In 1 case examined 10 hours after coitus, I found dead spermatozoa.

In 1 case examined 12 hours after coitus, I found dead spermatozoa.

In 5 cases examined 15 hours after coitus, I did not find any spermatozoa.

In 5 cases examined 20 hours after coitus, I found dead spermatozoa in 1 case and in 4 cases not any.

In 1 case examined 1 day after coitus, I did not find any spermatozoa.

In 6 cases examined 2 days after coitus, I did not find any spermatozoa.

In 3 cases examined 3 days after coitus, I did not find any spermatozoa.

In 2 cases examined 4 days after coitus, I did not find any spermatozoa.

In 1 case examined 5 days after coitus, I did not find any spermatozoa.

The number of cases that can be seen as early as 1 hour after coitus is not many, and those seen later than 2 hours are not useful, except for scientific purposes. I have looked for spermatozoa in the vagina in many more than the above 62 cases, but have only included in the above list those cases where a previous or subsequent examination showed that the husband had live spermatozoa. It

would obviously be ridiculous to include cases where no or only dead spermatozoa are found in the vagina, and where subsequent examinations reveal that the semen of the male always contained either none, or only dead spermatozoa.

From the above experiments we can draw the following conclusions:

1. In the absence of menstruation and cervical catarrh, live spermatozoa are never found in the vagina 12 hours after coitus, and the vast majority of spermatozoa that remain in the vagina die during the first hour after coitus.

2. In view of the fact that live spermatozoa are extruded from the uterus during menstruation, coitus just *before* menstruation is not a good time for impregnation. In fact, any spermatozoa that have not reached the Fallopian tube, or at least the ostium uteri when menstruation occurs, are lost. This is also in accord with the clinical data of noted authorities. Thus *Kisch* [36, 37] states that the best time for impregnation is 10–14 days after the commencement of menstruation. The statistics of the orthodox Jewish women bear out this conclusion also. As is well known these women do not have connection for 7 days after the cessation of menstruation, and even if menstruation lasts only one hour, they still count the 5 days that menstruation ordinarily takes, so that in any event they do not have connection for at least 12 days after the commencement of menstruation, and these women are especially noted for their large families.

3. We ought not to worry about semen flowing out of the vagina some time after coitus, as most spermatozoa in the vagina begin to lose their motility as early as 15 minutes after ejaculation, and almost all are dead within an hour. This point will, however, be discussed in detail in the next few pages.

CHAPTER III

Behavior of Spermatozoa in the Normal Cervix—*Haussmann's* Observations—*Percy's* Case—Author's Observations—Effect of Catarrhal Secretions upon the Vitality of Spermatozoa—Illustrative Cases—Effect of Alkaline Douche upon the Vitality of Spermatozoa.

I refer herein to the behavior of spermatozoa on, and just within the cervical os. Before discussion I would again like to draw attention to the important point that the reaction of the cervical mucus is alkaline, while that of the vagina is acid. *Haussmann*[30] has made some, though very few observations which will be given before my own. His observations are as follows:

Sixteen hours after coitus, although no spermatozoa at all were found in the vagina, a few slightly lively ones, together with many dead ones, were found in the cervical mucus.

Twelve hours after coitus, many lively spermatozoa were found in the cervical mucus, although the patient used twice daily a copper sulphate douche, which kills spermatozoa.

Three days after coitus, a few live spermatozoa were found in the cervical mucus, although twice daily vaginal douches of 2% carbolic acid were made.

Five and one-half days after coitus, a few lively spermatozoa were found in the cervical mucus.

Seven and one-half days after coitus a few weak, living spermatozoa were found in the cervical mucus.

Eight days after coitus no spermatozoa at all were found in the cervical mucus.

Percy,[52] way back in 1861, claimed to have found live spermatozoa in the cervical mucus 8½ days after coitus. This is the longest case on record.

I have thus far made 152 observations and experiments upon the behavior of spermatozoa in the cervix, and my own results are as follows:

In 5 cases examined one hour after coitus, I found live spermatozoa 2 times, dead spermatozoa once, and no spermatozoa 2 times.

In 15 observations made 2 hours after coitus, I found live spermatozoa 8 times, dead spermatozoa 3 times, and none 4 times.

In 21 observations made 3 hours after coitus, I found live spermatozoa 9 times, dead spermatozoa 5 times and none 7 times.

In 20 observations made 4 hours after coitus, I found live spermatozoa 8 times, dead spermatozoa 4 times, and none 8 times.

In 7 observations made 5 hours after coitus, I found live spermatozoa 2 times, dead spermatozoa 2 times, and none 3 times.

In 6 observations made 6 hours after coitus, I

found live spermatozoa 4 times, and dead ones 2 times.

In 5 observations made 7 hours after coitus, I found live spermatozoa 3 times, dead ones once, and in one not any.

In 2 observations made 8 hours after coitus, I found live spermatozoa one time, and none one time.

In 1 observation 9 hours after coitus, I found only dead spermatozoa.

In 7 observations made 10 hours after coitus, I found live spermatozoa twice, dead spermatozoa 4 times, and no spermatozoa one time.

In 3 observations made 11 hours after coitus, I found live spermatozoa twice, and dead ones one time.

In 4 observations made 12 hours after coitus, I found live spermatozoa 3 times, and dead ones one time.

In 12 observations made 15 hours after coitus, I never found live spermatozoa, and only once dead ones.

In 13 observations made 20 hours after coitus, I found live spermatozoa twice, dead spermatozoa 5 times, and no spermatozoa 6 times.

In one observation made one day after coitus, I found live spermatozoa.

In 14 observations made 2 days after coitus, I found live spermatozoa 3 times, dead spermatozoa once, and no spermatozoa 10 times.

In 8 observations made 3 days after coitus, I found live spermatozoa 2 times, dead spermatozoa 2 times, and no spermatozoa 4 times.

In 6 observations made 4 days after coitus, I never found live spermatozoa, and only twice dead ones.

In 2 observations made 5 days after coitus, I found live spermatozoa once, and in the other no spermatozoa.

I desire to call particular attention to the fact that my 152 observations were made strictly upon sterility patients, while *Haussmann's* observations were made upon women who were not sterile, and the same is true of the other observers also. Naturally one would not expect to find live spermatozoa in the genitals of women who are sterile, as frequently as in women who are not. It will be shown further on that it is this absence or death of spermatozoa in the genitals (even though the husband is normal) that is often the chief cause of the sterility and gives us a cue to what portion of the genital tract of the female we must assign the responsibility for the sterility.

I will now give some of my observations and experiments upon the effect of catarrhal secretions, alkaline douches and various other factors upon the behavior of spermatozoa in the cervix. The full list of all my observations, examinations and experiments (which are at present over 400 in number) will be found collected under that title toward

the end of this book, but at present only those relating to the behavior of spermatozoa in the *cervix* will be discussed.

That the secretions of the uterus do at times kill the spermatozoa is proven by the following case of sterility (Examinations 27 and 28). Three hours after coitus normal live spermatozoa were found in the condom specimen. On two other examinations made respectively 4 and 6 hours after coitus, either none or many dead spermatozoa were found on the cervical os. If in this case no spermatozoa would have been found on the cervical os, we might have thought that the husband might possibly be afflicted with some abnormality of the penis or have premature ejaculation, etc., but inasmuch as we see that he is able to deposit his semen upon the cervix, and we know from the condom specimen that when his semen leaves his penis his spermatozoa are alive, we must conclude that they have been killed by the cervical secretions. And it is not a rare condition to find a thick plug of mucus obstructing the cervical os, through which it seems impossible for the spermatozoa to penetrate.

A case that more fully demonstrates the effect of catarrhal inflammation upon spermatozoa, is illustrated in the case of Mrs. A. D. (Examinations 66 to 73, pages 143, 144 and 145).

One and one-half hours after coitus showed many lively spermatozoa in the cervix.

Eleven hours after coitus showed many dead

spermatozoa in the cervical mucus, which was markedly *acid*.

I then ordered the patient to take an alkaline douche before coitus, which she did with the following result:

Eighteen hours after coitus and after a phosphate of soda douche was taken before the coitus, we still find no spermatozoa in the cervical mucus, although the mucus is now alkaline.

Two more examinations were made, and always either no spermatozoa or only dead ones were found. On one occasion the reaction of the mucus was found to be neutral.

What are we to conclude from these 4 examinations? In the first place we know that the husband is normal. In the second place we see that there is something in the uterine secretion that kills the spermatozoa. We notice that if the examination is made very early (1½ hours after coitus), live spermatozoa are found in the cervical mucus, but if made later no spermatozoa, or only dead ones are found. At first I thought that it was the acidity of the secretion that did the harm, so I ordered an alkaline douche, which did render the secretion alkaline, yet the spermatozoa were killed nevertheless.

The subsequent history is further interesting. The patient went out of town and had a curettage, and was seen by me three months later and showed the following:

Three hours after coitus; vaginal mucus acid,

except where there was a large pool of semen, which was alkaline. In this pool were many large spermatozoa, but all dead. Cervical mucus was alkaline and contained many live spermatozoa.

Seventy-five Hours after Coitus.—Many *lively* spermatozoa were found in the cervical mucus and high up in the cervix. Cervical mucus was alkaline. In both these last two examinations no alkaline douche was taken and still the reaction of the cervical mucus was alkaline.

We thus see the result of the curettage. We saw that before the curettage there was something about the uterine mucosa which not only killed the spermatozoa, but also rendered the uterine secretion acid. We saw that it was not the acidity alone that killed the spermatozoa, for they were still found dead even if the reaction of the mucus was artificially made alkaline. After the curettage, not only did the cervical mucus remain alkaline without artificial help, but also *live* spermatozoa were found in the cervical mucus and high up in the cervix 75 *hours* after coitus.

An artificial inflammation of the cervix brought on by chemical irritation can also so alter its secretion that it is inimical to the life of the spermatozoa. This was shown in the above case on a later occasion. The woman had an eroded cervix which I treated by touching it up with a strong silver nitrate solution. As a result the entire cervix was for a time inflamed. I was interested to know what effect this inflammation would have

upon spermatozoa, and found (Examination 73) that at this time, 7 hours after coitus, no spermatozoa were present, either on the os or within the cervix.

Another instance of uterine secretions killing spermatozoa is the case of A. G. (Examinations 74 to 81, pp. 145, 146). In this case the condom specimen showed live spermatozoa. Examination 2 hours after coitus also showed live spermatozoa in cervix. But 6 other examinations made at later periods after coitus showed either no spermatozoa at all, or only dead ones in various portions of the genital canal. The uterus in this case was very small, but even if too small to support a growing fetus, there was no reason why the spermatozoa should have been killed. I have made many examinations in absolutely infantile uteri, and have always found live spermatozoa in various portions of the genital tract, unless there also existed some other condition that was inimical to spermatozoa.

Menstrual blood does not necessarily kill spermatozoa, as I found live spermatozoa on the cervix on one occasion during menstruation. According to *Kisch* [36, 37] it happens, though rarely, that impregnation follows a coitus during menstruation.

Haussmann [30] says that the irrigation of the vagina before coitus with an alkaline douche is of no use, but on this point I cannot agree with him. Time after time have I found live spermatozoa on the cervix after the patient had taken a phosphate

of soda douche (31 to the pint of water) before coitus, where previously only dead ones were found. I have also found the vagina alkaline 12 hours after such a douche. As examples of the effect of alkaline douches upon the vitality of spermatozoa in the cervix there may be mentioned Examinations 30 and 31, 36, 37 and 38, 283 and 284, 379 and 380, and others.

Although live spermatozoa have been found in the cervical mucus as late as 8½ days after coitus, it must be understood that this is the exception and not the rule. In 152 examinations of spermatozoa in the cervix, I never found live spermatozoa later than 5 days after coitus. As a matter of fact one must often examine many specimens before he can find live spermatozoa in the cervix 2, 3, 4 or 5 days after coitus. The survival of spermatozoa in the cervical mucus varies in different cases and is also influenced by many factors, such as the size of the os, the mechanism and frequency of coitus, etc.

When we find live spermatozoa, we also find many dead ones, and the later after coitus these examinations are made, the less is the number of live and the more the number of dead spermatozoa. It is only a small minority of the spermatozoa ejaculated from the male that ever reach the uterus proper.

CHAPTER IV

Theory of the Importance of the Receptaculum Seminis in Sterility—Objections to Theory—*Runge's* Theory of the Effect of Effluvium Seminis on Impregnation —*Runge's* Statistics—Author's Objections to *Runge's* Theory—Deductions to be Drawn from the Behavior of Spermatozoa in the Cervix.

It has been claimed that during coitus a pool of semen is formed in the vagina, and that for some time after coitus the cervix is bathed in this pool, that the cervical os opens and closes and, by a sort of suction action, the spermatozoa enter the cervix. The posterior vaginal vault has, therefore, been called the *receptaculum seminis.* Upon this theory, women desiring to become gravid, have been instructed to remain quiet after coitus with hips elevated in order to help form and preserve this pool. I have, however, strong doubts whether this theory is correct. In the first place the cervix is generally too short, in the second place there are too many hindrances to the wanderings of the spermatozoa, and it would take too long to reach the cervix. We have seen that in the vagina the spermatozoa begin to lose their motility 10 to 15 minutes after coitus, and most of them are dead by the end of the first hour; therefore, except in unusual cases, only

those spermatozoa which are directly thrown upon the cervix during coitus ever reach the uterus proper. In this connection I must repeat again what I said at the beginning—namely, that in studying the subject of sterility we must not allow rare exceptions to cloud our judgment, and in making the above statement, I am fully aware that in rare cases impregnation has followed the mere deposit of semen upon the external genitals of the female without any intromission whatsoever.

The question of the influence and importance of *effluvium seminis* (the flowing out of semen from the vagina after coitus) has received new impetus through a recently published article by *Runge*.[42] This author, in a very powerful and brilliant article,—brilliant because it is based upon true scientific investigations and not on theory alone—comes to the conclusion that effluvium seminis is one of the chief causes of sterility. I have spent many hours in studying this article, and have spent many days in making original investigations and repeating some of his experiments, but have come to the conclusion that effluvium seminis has not nearly the importance that this author attributes to it. The subject is of very great importance, and I therefore make no apology for going into this theory of *Runge* at some length and for giving my own observations to confirm my views.

Runge has observed that very many sterile women complain that their husband's semen runs out of their vagina after coitus, and he set out to

investigate what effect this had upon the presence of spermatozoa in the female genitals. His mode of procedure was as follows: Whenever a woman came to his clinic complaining of sterility, he examined her, and if he found her genitals normal and with no gross lesion to account for the sterility, he had the husband's condom specimen examined. If that was found normal he investigated the presence of spermatozoa in the female genitals six, twelve and thirty-six hours after coitus. He thus obtained 66 sterile women with perfectly normal genital organs. As a control, he took 17 women who had borne children and who also had perfectly normal organs as far as could be determined from ordinary gynecological examination. In his 66 sterility cases (in all of which, it must be remembered, the condom specimen was normal) he could not find spermatozoa in the genitals in 34 cases, that is in 51½%, while in his 17 non-sterility cases he only found them absent in 3 cases, or 17½%. His next statistics tell what portion of the genital canal showed the most absence of spermatozoa, as follows:

Absence of Spermatozoa

	Sterility Cases.	Non-sterility Cases.
Vagina	77.7%	25.5%
Cervix	74.0%	37.5%
Fundus	88.5%	40.6%

He next gives us three sets of statistics show-

ing at what times after coitus the spermatozoa were absent.

Absence of Spermatozoa

	Six Hours after Coitus.		Twelve Hours after Coitus.		Thirty-six Hours after Coitus.	
	Sterility Cases.	Non-sterility Cases.	Sterility Cases.	Non-sterility Cases.	Sterility Cases.	Non-sterility Cases.
Vagina. .	56.7%	0%	82%	23%	95.6%	25%
Cervix. .	62.1%	14.3%	80.3%	30.7%	100.0%	37.5%
Fundus. .	78.4%	0%	93.4%	23%	91.3%	75%

From these observations *Runge* concludes that the absence of the formation of a receptaculum seminis, as evidenced by effluvium seminis, is a potent factor in the causation of sterility, and recommends various procedures in case the posterior vaginal vault is not sufficiently developed to overcome this difficulty. He advocates such methods as tamponade, massage, also different postures during and after coitus to favor the keeping in of the semen, and in obstinate cases the formation of a posterior vaginal vault by operation. I am afraid, however, that in his enthusiasm to prove his theory, our author has allowed himself to be betrayed into some very serious scientific errors.

In the first place, it is indeed true that very many sterile women do complain that the semen flows out after coitus. To them this seems a very natural and simple explanation for the sterility. It occurred to me, however, that the flowing out of

semen after coitus might possibly not be a rare condition in married life, and in order to investigate this question, upon which *Runge* lays such great stress as a cause of sterility, I interrogated 132 women who have had children in regard to this occurrence. These cases I took at random from the gynecological clinic of Mount Sinai Hospital Dispensary.

My original intention was to take an even 100 cases, but when that number had been reached I found that I had a good many who were in doubt about the occurrence; some were widows or old women who did not remember if this had taken place; then again I found a good many whose husbands practised withdrawal, and these also could not answer the question properly. I therefore continued my investigations, and when I had questioned 132 married women, all of whom had had one or more children, I found that I had 25 doubtful answers for the reasons above given, leaving 107 from which to draw conclusions. In these 107 cases I was surprised to obtain a history that the seminal fluid runs out after coitus in over 80% of the cases.

Runge, in his 53 sterility cases, obtains a history of this condition in a little over 79% of his cases, so that we see that the occurrence of effluvium seminis is about the same in sterility as in non-sterility cases; in fact, if anything, it occurs a little more frequently in the non-sterility than in the sterility cases. My cases were taken from the

gynecological clinic, and include almost every pathological gynecological condition. As I do not wish to burden this work with statistics I will not insert the list of my observations here, but will place them with other lists at the end of the book on pages 240-245.

For the present I will only repeat that my statistics include the following pathological conditions (arranged in alphabetical order without special classification): Anteflexion and stenosis, 1 case; Cystocele and rectocele, 3 cases; Cystocele, rectocele, and parametritis, 1 case; Cystocele, 3 cases; Cystocele, rectocele, and retroversion, 2 cases; Cystocele, rectocele, and lacerated cervix, 2 cases; Cystocele and gravid, 1 case; Carcinoma of cervix, 1 case; Constipation, 1 case; Ectopic pregnancy, 3 cases; Endometritis, 10 cases; Eczema vulvi, 1 case; Eroded cervix and salpingitis, 1 case; Enteroptosis, 1 case; Eroded cervix and endometritis, 1 case; Eroded and lacerated cervix, 1 case; Eroded cervix, 1 case; Cervix lacerated, 2 cases; Cervix hypertrophied, 1 case; Endometritis and cystic ovary, 1 case; Gravid, 16 cases; Gonorrhea, 1 case; Hemorrhagic endometritis, 1 case; Hemorrhage, 1 case; Fibroid, 2 cases; Lues, 2 cases; Miscarriage, 3 cases; Metritis (chronic), 2 cases; Negative, 10 cases; Nephroptosis, 1 case; Lactation atrophy, 1 case; Oophoritis, 2 cases; Ovarian cyst, 2 cases; Ovary prolapse, 1 case; Post-operative adhesions, 2 cases; Parametritis, 3 cases; Post-operative ectopic, 2 cases; Retroflexion, 7 cases;

Retroversion, 4 cases; Retroversion and parametritis, 1 case; Retroversion and eroded cervix, 1 case; Retroversion and prolapsed ovary, 1 case, and Salpingo-oophoritis, 5 cases. In the above list no attempt has been made at any classification, the diagnosis having been simply copied from the history cards, and the doubtful cases of effluvium seminis are not included.

Again, an examination of my list will show that among those patients who will tell you that the semen flows out after coitus, are many with 4 and 6 children, and some even with 11 and 12 children. Indeed, I have seen many women with marked cystocele and rectocele in which it is no wonder that the semen runs out, as they have practically no posterior vaginal vault at all, but who nevertheless are constantly becoming gravid.

I have carefully questioned these latter cases, and have been told that in many cases this condition began after the birth of the second or third child, but in spite of it they continued to become gravid.

Let us now consider the next point brought out by *Runge*. He found in 66 sterility cases (in which the condom showed normal spermatozoa) that spermatozoa were absent from the genitals in 51½%, while in 17 non-sterility cases he only found them absent in 17½%. I wish again to emphasize one important point in all of *Runge's* statistics. *Runge* did not take his sterility and also his non-sterility cases at random as they came along, but, on the

contrary, as he himself admits, he picked them out. He took only perfectly normal women. His method of investigation has already been outlined on page 28, but this particular point is so important that I may be pardoned for repeating it. His method was as follows: Whenever a woman presented herself for sterility, he examined her and if he found no reason for the sterility, if, as he expresses it, he found no gross lesion to account for it, he examined the condom specimen, and then investigated further if the condom specimen was normal. He thus picked out the very best cases for his investigations, the cases that ought to give the highest percentage of spermatozoa in the genitals, and in these cases he found spermatozoa absent in 51½% of the sterility and 17½% in the non-sterility cases. I think that the examinations must have been either very carelessly made or only one or two examinations made in each case. I have looked over my first 50 cases in which I examined for spermatozoa in the genitals (all of which were sterility cases) and found spermatozoa absent in only 12%. Had I made only one or two examinations I would probably have found more cases in which the spermatozoa were absent, because in some of the cases it took four and even more examinations before I could demonstrate spermatozoa in the genitals.

This, in fact, is the fault with *Runge's* statistics, he did not make enough examinations, for he himself admits that he made but 136 examinations in

83 cases, not even two to each case. In other words in most of his cases if he did not find spermatozoa at the first examination, he put it down as a case in which spermatozoa were absent. It is for this reason that he does not find spermatozoa as often as he should have both in his sterility and non-sterility cases.

The contrast is even greater when we consider that he picked out the very best cases—namely, normal women, while my cases were the regular run of sterility cases, and in very many of them there were obvious reasons why spermatozoa should not be present. Moreover, my investigations began in 1905 (see list of examinations and experiments, pp. 124-238), while *Runge's* article first appeared in 1909, so that many of my 50 cases were investigated and the results recorded before I knew anything about *Runge* or his theory. In other words, my investigations were made without any idea of either proving or disproving any particular contention, for it must be admitted that when we start out making investigations with some pet theory in view, which we would like to substantiate, we run the danger of allowing ourselves to become partial and to look at everything in a one-sided manner. It is for this reason that I lay so much stress upon the point that my investigations were commenced four years before *Runge* came out with his theory and that I could not therefore have been influenced by it.

Taking up his next set of statistics we find simi-

lar differences between his figures and my figures. I have made no statistics or investigations in non-sterile women, as all my work has been done with those who were sterile, so I can make no comparison here. In his sterility cases (see statistics, pages 28, 29) *Runge* finds an absence of spermatozoa in the vagina in 77.7%, in the cervix in 74%, and in the fundus in 88.6%. My cases on the other hand show that spermatozoa were absent in the vagina in 18%, in the cervix in 24½%, and in the fundus in 33%. I would again like to emphasize that the reason I have been able to find spermatozoa in the genitals two or three times as often as *Runge* is only because I have made two or three times as many examinations to each case as he has. When I did not find spermatozoa in any particular case, I repeated the examination, sometimes making examination after examination, and sometimes having the patient use an alkaline douche previous to coitus, before I put it down as a case in which spermatozoa are absent, while *Runge* himself expressly states that he made only 136 investigations in 83 cases.

Coming now to his last series of statistics, those showing the absence of spermatozoa at various times after coitus (see page 29), we likewise find some scientific errors. In the first place he does not state whether the spermatozoa found were alive or dead. In his most important group, for instance, those examined 6 hours after coitus, it may be taken for granted that all the spermatozoa

found in the vagina were dead, as almost all the spermatozoa that remain in the vagina die within the first hour after coitus. What difference can it make therefore, whether they were always found present in the non-sterile and only in about half the sterile cases? We cannot draw any practical conclusions from his statistics of spermatozoa found in the cervix and fundus, as in the absence of any statement on the subject we cannot reason out whether they were alive or dead. Again the fact that no spermatozoa were found in the cervix or fundus a certain time after coitus, is no proof that the absence of a well-developed posterior vaginal vault is the cause of their absence. Time after time have I found spermatozoa in the internal genitals in spite of the fact that the patient declared that all the semen runs out after coitus. *Natanson* and *Königstein*[49] have also made investigations in this same field and have also found that, contrary to the experience of *Runge,* spermatozoa were found in the majority of cases of effluvium seminis.

I believe, however, the greatest scientific error in *Runge's* statistics and conclusions is the meagreness of the examination. Take, for instance, his most important group, that giving the result 6 hours after coitus. He tells us that in the sterility cases spermatozoa were absent from the vagina, cervix and fundus in 56.7%, 62.1% and 78.4% respectively, and compares this with the non-sterility cases in which they were found absent from the

same parts in 0%, 14.3% and 0% respectively. But when we look at the list from which he obtains these percentages we see at once that his conclusions are only based upon the investigations of 7 non-sterility cases. How any scientist can draw conclusions and make comparisons when he has only investigated 7 cases is certainly remarkable.

For all these reasons I have come to the conclusion that effluvium seminis has not the importance that *Runge* attributes to it. I have also had cases suffering from effluvium seminis, and in which no spermatozoa could be demonstrated in the genitals, but after having the patient take an alkaline douche before coitus, spermatozoa in large numbers were easily found, showing, as already stated, that the mere absence of spermatozoa from the genitals does not at all prove that the absence of a well-developed posterior vaginal vault is the cause of the trouble.

I do not wish to be understood as saying that the spermatozoa that are deposited in the vagina *never* reach the fundus and never cause impregnation. I have myself found live spermatozoa in the vagina 3 hours after coitus, and I have repeatedly stated that impregnation has followed the deposit of spermatozoa upon the external genitals, and has taken place in the presence of merely a pinhole opening in the hymen. But all these are exceptions and should not interfere with the general statement that in the vast majority of cases it is only the spermatozoa that hit the cervix during

coitus that cause impregnation. As long as our author advises various postures during coitus to prevent effluvium seminis, or even tamponade and massage to develop the posterior vaginal vault, we can find no fault with him, but when he advises operation to deepen the posterior vaginal vault, I think that he ought to be absolutely sure of his theory, and I do not think that he has proven his case. The operation has not even the excuse so often given for performing a curettage and dilatation. In the latter operation the physician often soothes his conscience by a history of dysmenorrhea or the finding of an anteflexion or endometritis, in which the operation would be indicated perhaps even if sterility did not exist. But an operation to deepen the vaginal vault, besides being more difficult, is only performed for this condition and cannot possibly be of any use for anything else.

From the above observations of the behavior of spermatozoa in the cervix we may draw the following conclusions:

1. Vaginal douches after coitus to prevent conception are not certain, as live spermatozoa have been found 3 days after coitus, in spite of twice daily vaginal douches.

2. Amputation of the cervix for sterility in case of a long conical cervix, is sensible, for then the semen can be more easily ejaculated on to the cervix than on either side of it.

3. The more passionate a man is, or rather the

more forcibly his semen is expelled, the greater the chances of impregnation, as more would hit the cervix and less drop into the vagina.

4. We ought not to worry about seminal fluid running out of the vagina after coitus, as it would be of little use anyway, for it is only the semen that is on the cervix that causes impregnation, as a rule.

5. Alkaline douches taken before coitus are useful in certain cases of sterility and help to preserve the vitality of the spermatozoa.

CHAPTER V

Behavior of Spermatozoa in the Fundus Uteri—*Haussmann's* Observations—Author's Observations—Difficulty in Making Observations.

The investigation of spermatozoa in the fundus uteri is not nearly as satisfactory or as certain as that of the cervix or vagina. *Haussmann* [30] has made a few investigations and I will first give his method of procedure and results before describing my own investigations. He separates the vaginal walls with blades, pulls down the uterus, mops out the cervix and tests the reaction of the cervical mucus. It must be alkaline; if acid it is simply the vaginal mucus that has been pushed upward, and any deductions therefrom are erroneous.

In 10 cases with normal os, *Haussmann* always found spermatozoa in the uterine mucus, while in 5 cases with a narrow os he never found any.

There are some that claim that spermatozoa can enter everywhere, except in absolute atresia; they claim that wherever the sound can enter, or the minutest amount of menstrual blood can come out, the spermatozoa can go in, for they can enter the uterine openings of the Fallopian tubes, which are certainly smaller than the smallest os. *Haussmann*

objects to all this on the following grounds: In the first place the menstrual blood is under pressure of the uterine walls and has practically only one exit, the cervical os, whereas the spermatozoa from without have no such pressure behind them and must wander about in search of the opening. The argument of the Fallopian tube openings does not hold either, because spermatozoa can live 8 days and longer in the uterus, where they can wander around and have plenty of time to find the openings of the Fallopian tubes, whereas in the vagina they begin to lose their motility within 15 minutes after ejaculation and most of them are dead within the first hour.

In my earlier investigations I closely followed the technique of *Haussmann,* but later made certain alterations. In the first place, after one has made many examinations it is not necessary to test the reaction of the mucus, as the microscopic picture will tell you whether the cells therein are vaginal or cervical. In the next place, in trying to obtain spermatozoa from the fundus, the danger of contaminating the specimen with spermatozoa from the cervical mucus is very great. In obtaining spermatozoa from the fundus, I make it a point always to first examine the mucus from the cervix for spermatozoa, before investigating for the presence of spermatozoa in the fundus. My technique will be fully described later on on page 107, when giving the technique of the examination of spermatozoa in the female genitals in detail, but a few

words here upon the subject will be necessary. As I will describe later on, I have tried every method proposed by the few authors who have investigated the subject, including the method of *Runge,* and have also devised a special form of syringe to obtain spermatozoa from the fundus uteri, with the least danger of contamination from spermatozoa in the cervix, but am free to acknowledge that we can never be as certain that our specimen has not been contaminated as in obtaining spermatozoa from other parts of the genitals.

At first blush, one might imagine that the results are absolutely useless, but this is not the case. It is true that if the examination is made shortly after coitus and we find spermatozoa in the cervix, we cannot be absolutely sure (even with my instrument) that any spermatozoa found in the fundus uteri may not have been pushed forward with the instrument as it passes through the cervix, or may not have adhered to the instrument from the cervix on its way out; but if the investigation is made later, say between one and two days after coitus, and if the precaution is employed as stated above by first making many examinations of the cervical mucus for spermatozoa, we will in very many cases find no spermatozoa in the cervix, and then on reaching the fundus find live spermatozoa therein. In that event we can say that these came from the fundus. It is true that the later examinations are made after coitus, the more difficult it is to find spermatozoa, and the more likely we are

not to find any at all in the genitals, but if found we are much more certain where they came from, and in addition (as will be pointed out later on) the more important will be the information to be derived therefrom.

I have thus far made 65 investigations of spermatozoa in the fundus uteri. It must be said that not in every case, by any means, can we obtain a specimen of the mucus of the fundus for examination. There are very many cases in which there is such an acute anteflexion, in which the uterus is bent entirely upon itself, so that it is impossible to get even a sound into the fundus, not to speak of a platinum loop or a syringe. So that although I have tried in very many cases to obtain mucus from the fundus for examination, it is only in the following 65 investigations that I could be certain that the specimen obtained actually came from the fundus and was not contaminated with cervical mucus. In reading the technique of some of the investigators, one cannot see how they avoided contamination.

In 1 case examined 1 hour after coitus, no spermatozoa were found.

In 4 cases examined 2 hours after coitus, I found live spermatozoa twice, and no spermatozoa twice.

In 9 investigations made 3 hours after coitus, I found live spermatozoa twice, dead spermatozoa once, and no spermatozoa in 6 times.

In 14 investigations made 4 hours after coitus, I

found live spermatozoa 3 times, dead spermatozoa once, and in the rest not any spermatozoa.

In 3 investigations made 5 hours after coitus, I never found any live spermatozoa.

In 3 investigations made 6 hours after coitus, I found live spermatozoa once, dead spermatozoa once, and no spermatozoa once.

In 1 case investigated 7 hours after coitus, I found live spermatozoa.

In 1 case investigated 10 hours after coitus, I found live spermatozoa.

In 1 case investigated 12 hours after coitus, I found no spermatozoa.

In 4 cases investigated 15 hours after coitus, I found no spermatozoa.

In 6 investigations 20 hours after coitus, I found live spermatozoa twice, dead spermatozoa once, and no spermatozoa 3 times.

In 2 cases investigated 1 day after coitus, I found dead spermatozoa once, and no spermatozoa once.

In 8 investigations made 2 days after coitus, I found live spermatozoa once, and dead spermatozoa once, and in the rest not any spermatozoa.

In 2 investigations made 3 days after coitus, I found no spermatozoa.

In 3 investigations made 4 days after coitus, I found no spermatozoa.

In 1 investigation made 5 days after coitus, I found no spermatozoa.

In 1 investigation made 6 days after coitus, I found no spermatozoa.

In 1 investigation made 7 days after coitus, I found dead spermatozoa. This is the longest time after coitus that I have ever seen spermatozoa in the genitals. As stated before, the longest time after coitus that I have ever seen *live* spermatozoa was in the cervix, 5 days after coitus.

I have thus far made 279 investigations of the various parts of the genitals for spermatozoa, 62 in the vagina, 152 in the cervix and 65 in the fundus. A complete tabulated list will be found, with my other lists, on page 239.

I have many times pushed cervical mucus laden with live spermatozoa with a strong sound into the uterus proper, past the bend in an anteflexion, but have never done the slightest good thereby. Other investigators have done the same thing and have always failed.

CHAPTER VI

Behavior of Spermatozoa in the Fallopian Tubes—Impossibility of Obtaining Specimens—Author's Suggestions—Value of Author's Method in Sterility Cases.

Coming now to parts beyond the uterus, *Haussmann* [30] considers it practically impossible to obtain mucus from the Fallopian tubes for examination for spermatozoa. *Tyler Smith* (Lancet, 1849), claims to have passed a probe through the cervix and fundus into the Fallopian tube, but *Haussmann* considers this impracticable, for the following reasons: In the first place, there is serious danger in going through the uterine tissues while probing for the openings of the Fallopian tubes; and in the second place, even if the probe did get into the Fallopian tube, in withdrawing it, it would become so contaminated with mucus from the body of the uterus and cervix, that any deductions therefrom would be erroneous. As a result, we are practically in the dark as to the wanderings of the spermatozoa after they have left the uterus, except what can be learned by analogy from the lower animals or from accidental medico-legal cases.

I perfectly agree with *Haussmann* that in the ordinary ways we cannot obtain any information

about the behavior of spermatozoa in the parts beyond the uterus. Wherever such investigations have been made in human beings, it was only in isolated and accidental cases, and not in a deliberate and systematic manner. Thus *Bab* [3] (page 1435) states that *Hirschfield* found spermatozoa in the tubes 14–16 hours after the coitus that killed the patient, and *Bailey* and *Miller*,[5] in their text-book of embryology, writing as late as 1911, express themselves as follows:

"The life of the spermatozoon within the female genital tract is not known. Moving spermatozoa have been found there 7–8 days after coitus. In one case of removal of the tubes living spermatozoa were found therein 3½ weeks after coitus."

It is for these reasons that I would like to suggest an original method of investigation, which would throw considerable light upon the behavior of spermatozoa in the genital tract beyond the uterus, also on their viability in the cervix, uterus and Fallopian tubes, and would, besides, prove of great practical value in determining the value of any particular operation for sterility. This method of investigation can be pursued by a gynecologist only (or in combination with a gynecologist) who has a large number of hospital cases at his command. It is as follows, and applies not merely to sterility cases, but to any woman during the childbearing period who is about to be operated upon, no matter for what condition.

Let the interne, whose duty it is to take the

patient's history, also enter on the card, besides the other facts, the date of the last coitus. If douches have been taken since then, this should also be noted with full particulars. In any gynecological operation, where a curettage precedes the regular operation, or is the only thing to be done, let the surgeon first swoop the curette around the cervix and empty the scraping into a sterile dish marked "cervix," and then after dilatation do the same in the fundus and empty these scrapings into another sterile dish marked "fundus." This takes only a few minutes to do, and then the interne can examine these scrapings later on for live and dead spermatozoa. If the operation includes the removal of one or both tubes or ovaries, these can also be examined later for live and dead spermatozoa.

In private practice, in certain cases, especially in sterility cases, the patient can be instructed to have coitus one, two or three nights before the operation, according to the statistics we desire. It should be remembered that these investigations are made in all gynecological operation cases and not only in sterility cases. Of course, from a few cases no deductions can be made; but if this simple procedure, which does not in any way interfere with the rapidity of the operation or in any other way, is followed, in about 1,000 cases we can have accurate data, as follows:

In stenosis of the cervical os, live spermatozoa or dead ones or none at all were found in the cervix or in the fundus or in the Fallopian tubes so

many hours or days after coitus. In normal cases in so many hours or days in the various portions of the genitals. In retroflexion, anteflexion, endometritis, etc., they were found present or absent in the genitals after so many hours or days. In tubal disease, spermatozoa may be found at the uterine end and not at the ovarian end, etc. After many laparotomies, we would know just how far and how fast spermatozoa travel in normal cases, how many are killed and where, how many and in what time spermatozoa (if any) reach a certain point in the various pathological conditions of the female genitals. I have only indicated some of the more common facts that can be learned by pursuing this method of investigation, and new ideas in this connection will naturally occur to every scientific gynecologist.

If, as a result of these investigations, we have accurate data about the progress of spermatozoa in the female genitalia in normal and pathological conditions, and where spermatozoa ought to be found a certain time after coitus, we could approach the practical treatment of sterility with much less guesswork than at present.

We could, for instance, as soon as the patient is ready for operation and already under anesthesia, dilate the cervix and carefully remove a particle of mucus from the fundus and have it examined at once for spermatozoa. There is nothing strange about this, as in operations for tumors the surgeon in doubt about the nature of the neo-

plasm has a frozen section made of a particle of the tumor and examined while the operation is in progress, and is guided in his work by the result of such examination. Surely the search for spermatozoa is a much more simple procedure than this. If live, active spermatozoa in sufficient numbers are found in the fundus, we know that simply removing the stenosis, or correcting the anteflexion, will not cure the sterility, as these conditions do *not* form a barrier to the ascent of spermatozoa. We would then conclude that the trouble lies higher up, in the tubes or ovaries, and therefore investigate, and if necessary operate on them at the same time.

If no spermatozoa are found at the fundus at a time after coitus, when according to our statistics they should be there, we might then decide that the stenosis, or the flexion or the malposition of the uterus, was the cause of the trouble, and rectify it.

If numerous dead spermatozoa are found at the fundus at a time after coitus when there should be numerous live ones, we could, perhaps, conclude that the flexion, stenosis, etc., form no barrier to the ascent of the spermatozoa, but that the catarrhal condition of the uterine mucosa (perhaps due to the flexion or malposition) causes the death of the spermatozoa, and treat our patient accordingly. These are but a few of the possible deductions, and numerous others will no doubt suggest themselves to the reader.

CHAPTER VII

Relationship of Various Pathological Conditions to Sterility—*Sims'* Observations—Author's Observations—*Kehrer's* Observations—Statistics of Various Authors.

As examples of the different opinions of the relationship of abnormalities of the sexual organs to sterility, we find *Kisch* [36, 37] quoting *Sims'* conclusions as follows:

"A conical cervix is found in 85% of sterility due to the female.

"If the cervix protrudes ½ inch into the vagina, sterility is very probable; if one inch, it is almost positive to follow; if more than an inch, it must cause sterility. Sterility is also bound to occur if the cervix does not project at all into the vagina." According to this, we see that the normal cervix can only vary within very narrow limits.

My own observations do not entirely support *Sims'* contentions. It is, indeed, true that a conical cervix is very often found in cases of sterility, and the same may be said of abnormal lengths of the cervix. But time after time have I found live spermatozoa in the fundus in spite of a conical

cervix or an abnormally long one. We may therefore say that while a conical cervix is very often found in cases of sterility and is the cause of the sterility in many cases, we cannot in any particular case blame it until we have investigated if it in fact causes a barrier to the ascent of the spermatozoa or is in such a position on account of its length or shape that the spermatozoa during coitus fall to either side of it and not on the os. As will repeatedly be pointed out, this is the supreme value of the cervix test for sterility over all other methods.

Sims, in common with some other authors, lays great stress upon dysmenorrhea as a cause of sterility, claiming that it often shows a mechanical narrowness of the cervix and thus forms a mechanical obstacle to fecundation. *Kisch* does not agree with him in this, because many women conceive who suffered in girlhood from dysmenorrhea, although after marriage not at all.

I have also carefully investigated the question of the relationship of dysmenorrhea to sterility, and must likewise differ with *Sims.* I have made careful notes in 146 cases of sterility and found the periods normal in 76, or 52%, and painful in 70, or 48%; thus, roughly speaking, a sterile woman is just as apt to have painful periods as a normal one. On the other hand, it is not at all uncommon to find women, who have borne children, suffer from dysmenorrhea, while, as a matter of fact, dysmenorrhea is so common in unmarried girls

(whether they will later be sterile or not) that it seems to be the rule.

It must be remembered, however, that dysmenorrhea and anteflexion and stenosis are not necessarily synonymous. I have found that acute anteflexion and a narrow os seems to be the rule in unmarried females, whether they will be sterile or not. It is only after childbirth that the anteflexion tends to disappear, as well as the narrow os. It is for this reason that acute anteflexion and a narrow os is found so often in sterile women, but it is not the cause of the sterility as often as is generally supposed.

In order to investigate this question of the relationship of dysmenorrhea to sterility, *Kehrer* investigated the question what effect marriage had upon cases of dysmenorrhea whether sterile or not. He found that dysmenorrhea is only slightly more frequent in sterile women than in those who have had children. He also found that the date of the birth of the first child after the wedding was not postponed in cases with abnormal genitals any more than in women with normal genitals. In both they occurred about the same time after the wedding, and in those cases where the period between the wedding and the birth of the first child was longer than normal, there were just as many cases with normal as with abnormal genitals.

Sims, however, tries to prove his theory of the relationship of anteversion and retroversion to sterility by the following statistics of his own.

	Number	Anteversion	Retroversion
Sterility Cases	250	103	68
Non-sterility Cases	255	61	111

In other words, in 250 sterile married women he found 103 with anteversion, while in 255 non-sterile married women he found only 61 cases of anteversion, and therefore concludes that the anteversion is the cause of the sterility.

It appears to me that an error was made in that he examined his non-sterility cases after they had given birth to children, and many of these patients may have had anteversions which were changed after childbirth to retroversions. He could with equal justice claim that retroversion *favored* pregnancy, because he found so many more cases of it in non-sterile women than in sterile women. As stated before, if we examine single girls, or married women shortly after marriage, we will find that in the large majority of cases the uterus is anteflexed or anteverted or both. I think this is the normal condition, whether the patient later on becomes sterile or not.

I have gone very much into detail on this very important question of the relationship of anteflexion, anteversion, stenosis, etc., with sterility, not only because I have made very many observations myself, but more particularly to show how varied are the opinions of our greatest authorities on this very essential and practical question. It is for such reasons that I have suggested the method of inves-

tigation above mentioned, to put an end to all theorizing about obstructions, etc., and to obtain accurate data for a practical working basis. Even so great an authority as *Kisch*[36, 37] says that we are still in the dark concerning many of the causes of sterility, and that in many cases we cannot find any apparent cause.

Equally uncertain are the facts about the prognosis of sterility. Thus, according to *Grünewaldt*, we have the following statistics:

Sterility	due	to	Endometritis showed	8.4% cures.
"	"	"	Myometritis showed	3.1% cures.
"	"	"	both together showed	0.0% cures.
"	"	"	Parametritis showed	9.0% cures.
"	"	"	Versions or Flexions, etc., showed	10.0% cures.
"	"	"	Stenosed os showed	7.5% cures.

According to *Kammerer*, only 3 cases were cured in his hospital practice (he does not say out of how many), and in his private practice he cured 25 out of 291 cases (about 8%).

Chrobach gives his experience as follows: Out of 71 cases treated for sterility:

In about 41% there was inflammation of the uterus (either the mucous, muscular or serous coat), and of these 34½% were cured.

Uterine deviations (25 cases), with 56% cures.

Stenosis or other anomaly of cervix (9 cases), with 55½% cures.

I will not quote any more statistics, as the fore-

going are sufficient to show how widely different are the opinions and results of some of our leading authorities on this very common gynecological condition. It seems that there should not be such a divergence of opinions. When we see how the diagnosis of endometritis is thrown about in some of our gynecological clinics; how, according to some authorities, almost every woman has some endometritis, just as, according to some, almost every person suffers more or less from nasal catarrh; and again, how endometritis is so often found in connection with other pathological conditions of the uterus, we can appreciate how difficult and how varied under ordinary circumstances must be the part assigned to endometritis as a cause of sterility. For every sterile woman with endometritis, I can show a dozen non-sterile women with marked endometritis, with an enormous amount of uterine discharge pouring out of the cervix, who are, nevertheless, constantly becoming pregnant. From my own observations and experiments, I would not put down endometritis, no matter how severe, as the cause of the sterility, if live spermatozoa are found in the interior of the uterus a long time after coitus.

If I find dead spermatozoa in the interior of the uterus shortly after coitus in a case where the condom specimen showed live spermatozoa, I would conclude, 1st, that the husband was normal; 2d, that any stenosis, conical cervix or displacement was not the cause of the sterility, because the

spermatozoa had successfully passed the obstruction; and 3d, that the endometritis or condition of the uterine mucosa or secretion was the cause of the death of the spermatozoa and the sterility. The treatment in that case would be directed toward the relief of the endometritis (the endometritis may, however, have been caused by the displacement of the uterus or other pathological condition), and if the sterility is then relieved, then, and then only, can we put it down in our statistics as a cure of sterility due to endometritis. I am free to confess, however, that the conclusions just expressed might have to be modified, or entirely reversed, according to what the statistics of several thousand cases would show, if investigated according to the method proposed by me in the previous pages. The same may be said of all the other pathological conditions mentioned in connection with sterility.

CHAPTER VIII

Statistics About Sterility—Sources of Error—One Child Sterility in Relationship to Sterility—Statistics of Various Authors—Author's Statistics—Stature, Age, Periods, Heredity and Sexual Passion in Relationship to Sterility—Difficulty of Obtaining Statistics About Sexual Passion—Author's Method of Investigation—Relationship of Marriage Age to Sterility—Menstruation and Sterility.

Before going into this very important subject and giving the results of the investigations of others as well as my own, I would like to call attention to a very important element of error which must be considered before drawing any conclusions. All statistics on sterility, based upon Health Department or Register Records, are unreliable, because they do not take into account those cases where the couple do not want children and take various means to prevent conception. Thus, to say that the record shows, within a certain period of time, so many marriages, and amongst them there were so many childless marriages, and then to deduce from these facts the percentage of sterility, is absolutely unreliable. Again, some of the register reports do not include in their

statistics abortions and stillbirths, so that deductions from such records are even more unreliable. Thus *Kisch* quotes many authors, who, from statistics like the above, deduce that the period between marriage and the date of the first child varies between 12 and 26 months (according to different authors). Such conclusions seem unwarranted, and the wide variations amongst the authors show it.

Looking over all the authors mentioned by *Kisch,* we may say that, roughly speaking, 10% of all marriages are sterile. The highest percentage seems to be in France, where 20% of all marriages are sterile, and in 24% there is one-child sterility.

Some German authorities claim that the children of one-child sterility cases are apt to be sterile. I have carefully investigated this question, and cannot agree with these authors. I have statistics of 256 sterility cases in private and dispensary practice, and find that on an average the mothers of my sterility cases had 9 children and the mothers of the husbands of my sterile women had on an average 8 children. It must be remarked, however, that most of these were dispensary cases, and came from a class of people who generally have large families. Still, this large average of children on the part of the mothers of the husbands and wives of sterile couples show that sterility is not caused by a condition of one-child sterility in the parents.

Duncan found in Edinburgh and Glasgow, out

of 4,447 marriages between 15 and 44 years of age, 15% sterility.

Grünewaldt, out of 900 married women (excluding widows and women over 35), found in his clinic 500 cases of sterility. Of these 500 cases, 300 were of the acquired and 190 of the congenital variety. This seems to be a very large percentage, even for a gynecological clinic; but the author does not tell us whether the sterility cases were patients who sought advice for the sterility and really wanted children, or were only accidentally discovered from the histories, in which case many of these patients may have used preventive methods, so that the sterility was artificial.

My own statistics are as follows: Out of 1,000 consecutive gynecological cases in the clinic, I found 70, or exactly 7%, who consulted for sterility. This does not include patients who came for other troubles and whose history showed them to be sterile, but only cases who applied to be treated for sterility. This, of course, does not represent all the sterility cases I have seen at the dispensary, as my investigations were drawn from several thousand gynecological cases, but I simply took exactly 1,000 consecutive cases in order to obtain the percentage of women applying for treatment for sterility at this clinic.

I have made careful study of my sterility cases, as regards stature, age, periods, number of children parents had, and sexual passion, and my results are as follows:

STATURE

Out of 155 cases, the husband was of *average size* in 65%, and *stout* in 35%, while the wife was of *average size* in 58% and *stout* in 42%. This seems to show that the tendency to be stout is more marked in sterile women for their age than in other women. I doubt that if we were to take 155 persons at random we would find 42% of fat people amongst them. This tendency on the part of sterile women to take on fat has been noticed by many authorities, and is believed by some to have an etiological bearing on the subject. I have made numerous investigations and experiments, and while I have been often successful in reducing the weight by thyroid medication and other means, in only one case did pregnancy follow thyroid medication, and this was also accompanied by loss in weight. Even in this case it is doubtful whether the thyroid and not the reduction in weight was responsible for the pregnancy.

AGE

In 139 cases the average age of the husband was 30¼, and of the wife 27½ years. This simply means the age when they came to me for advice. Many of my cases had already sought advice from other physicians at an earlier age, and many undoubtedly consulted other physicians at a later age after they had left me.

PERIODS

Out of 146 cases, the periods were *normal* in 52% and painful in 48%. This shows that there is no marked relationship between dysmenorrhea and sterility, inasmuch as a sterile woman is about just as apt to have normal periods as painful ones. As before mentioned, the periods of a sterile woman are about the same as those of an unmarried woman, whether she will be sterile or not. I have already discussed this question on page 52, and therefore will not repeat here.

NUMBER OF CHILDREN PARENTS HAD

As above stated, the average number of children the mothers of the respective husbands had was 8, and of the wife was almost 9. This is enough to show that, contrary to some German authorities, heredity seems to have no part in this connection.

I have also questioned my sterility cases, both husbands and wives, and found that in the vast number of cases the married brothers and sisters of either party were not sterile. As one remarkable exception, I may mention that I have as private patients three sisters, all of whom are sterile. This element of non-heredity in sterility is in marked contrast to my observations upon sexual passion. Time after time I have run across families in which all the members, both male and fe-

male, were very passionate sexually. From my observations (not only in sterility cases) I have come to the conclusion that sexual passion in both males and females is distinctly hereditary.

SEXUAL PASSION

This is a subject about which it is very difficult to obtain any accurate *scientific* information. In most of my cases I interviewed only the wife and obtained my information from her. It is a very difficult matter at any time to decide what constitutes normal sexual desire, and when it is to be considered increased or diminished. It is still more difficult when we have to take the patient's statement what he or she *thinks* is normal or increased or diminished sexual desire. Thus it is not at all uncommon for a man to tell you that his sexual ability is below par, because he has heard of a friend who can indulge in coitus several times a night, whereas he only indulges as many times a week. Again, the sexual passion largely depends upon the sexual passion of the partner. Thus a man with average sexual desire would not have much intercourse or as much sexual intercourse if his wife is very frigid or suffers from dyspareunia; whereas, if he had a wife who is very passionate and constantly fondling him, he would naturally have increased desire and perform the act more frequently. Again, most of my patients (female) were married but once, and never had

connection with any one except their own husband, and so had no standard to go by whether their own or their husband's desire was increased or diminished. Some women also do not care to admit that they have increased sexual desire, although the majority, thinking that it is important for the treatment (and in their desire to have children they will answer any question, no matter how delicate), will freely tell you what they consider the truth. It must also be remembered that people judge largely by comparison. So a man with very marked sexual desire, having for wife a woman with normal sexual desire, is apt to consider himself normal and his wife below par, and so forth.

Fully realizing all these difficulties, I have, nevertheless, attempted to gather some facts upon this very important subject, and have tried, as far as possible, to avoid many of the errors above mentioned, and to which such statistics are especially liable. While a few of the authors mentioned in the bibliography hereunto attached state in a general way what their impression is regarding the relationship of sexual desire to sterility, I believe this is the first attempt to collect actual data on the subject, as I have come across no regular statistics, even in the voluminous work of *Kisch*. I wish to state, also, that these facts (as well as most of my work on sterility), although collected almost entirely from dispensary patients, were *not* collected in the dispensary, where one has obviously not the time to go into such details. All

my work on this subject was done in my own private office, where I saw the patients not once, but often dozens of times in some cases, and where the patients, after seeing that I took a real interest in them (inasmuch as they did not have to pay anything for the examinations) were perfectly willing to answer frankly and truthfully all my questions. I desire to repeat, that if questioned with proper tact and dignity, no sterility patient will refuse to answer to what, under ordinary circumstances, would be considered embarrassing questions. I make this statement advisedly, because I know that all the answers to my questions were truthful, as far as the patients were able to speak on the subject.

The statistics given here are the result of a very careful investigation of the sexual history of 289 cases. As I could find no authority to go by, nor any standard as to what may be called normal, diminished or increased sexual desire, I made up the following rules and have been guided accordingly.

In the first place, I determined how many times on the average, except during the menses, sexual intercourse took place a week. As most people apply for relief for sterility at least a year after marriage, and in most cases after the second or third year, the novelty of sexual intercourse has already worn away. Then I carefully inquired which of the parties (or if both) desired the connection. In most of the cases the wife will tell you that it is

the husband who asks for it; but further inquiry often brings out the fact that the wife has the desire but does not care to ask her husband to have connection with her. I then ascertained the fact whether the wife cares for intercourse at all or only submits to please her husband. In those cases where the wife does not care for intercourse, I am careful to determine whether the frigidity is due to pain during the act. In several cases where coitus was frequently indulged in, I discovered that this was not due to increased sexual desire but to the fact that the couple thought they stood a better chance of having a child. If the man is questioned, I ascertain whether he thinks his wife is more or less passionate than women with whom he may have had intercourse before marriage. If it is the wife's second husband, I inquire if he is more or less passionate than the first one was. It must be stated that any *one* of these questions taken by itself may not mean very much, but if we take them all together, we can fairly make up our minds as to the sexual passion of each party. Furthermore, in my statistics I have considered the sexual passion *diminished* if (outside of the menstrual period) sexual intercourse was indulged in less than once a week on the average, and *increased* if performed more than four times a week. These facts were, of course, taken into account with all the other facts enumerated above in making up the statistics. My data then finally show that in 289 investigations the sexual passion was as follows:

	Husband	Wife
Normal	43.0%	35.2%
Increased	46.5%	20.7%
Diminished	10.4%	44.1%

We thus see that in almost half the cases the woman's sexual desire is diminished. While we all know that even in non-sterile families the woman is, as a general thing, not as passionate as the man, and although we possess no accurate statistics on the subject, the above data are sufficient to show that in sterile women the sexual passion is certainly much less than normal. As a matter of fact, it is not a rare condition to find the combination of sterility, infantile uterus, scant periods and lack of sexual desire.

RELATIONSHIP OF MARRIAGE AGE TO STERILITY

According to *Kisch*, the age of marriage seems to have an influence on sterility. Thus, in women who marry between twenty and twenty-four, sterility is rare, while it is most frequent in those who marry between fifteen and nineteen. After twenty-four sterility increases with every year of later life.

I do not think that the exact age has as much to do with it as the amount of genital development at marriage. If in India the genitals of a girl of fifteen are as much developed as those of a European of twenty, she ought not, in my opinion, to suffer any more from sterility than the latter.

Women who marry early (15 to 19), that is,

marry before the generative organs are fully developed, are especially liable to sterility. The earlier sexual intercourse is indulged in, the greater the liability to premature atrophy of the ovaries and senile sterility (*Kisch*). In Arabia, where women commence to have children at 11, they cease to have them at 20.

RELATIONSHIP OF MENSTRUATION TO STERILITY

Women who commence to menstruate early, cease late, their ovaries last longer, and they have more children than others, and are less liable to sterility.

In women who conceive often, the ovaries last longer and menstruation continues later in life.

Women who start menstruation late in life, stop to menstruate earlier, their ovaries undergo senile atrophy earlier, and they are more liable to sterility.

Women who menstruate at long intervals are more liable to sterility.

CHAPTER IX

Relative Frequency of Sterility in the Male and Female —Statistics of Various Authors—*Noeggerath's* Theory—Author's Objections to this Theory—*Brothers'* Observations—Author's Criticism of *Brothers'* Method of Procedure—Author's Statistics as to Man's Responsibility in Sterility—*Engelmann's* Observations and Statistics—Author's Objections to Them—Women at a Disadvantage in Statistics On Sterility.

RELATIVE FREQUENCY OF STERILITY IN THE MALE AND FEMALE

The following statistics are from Kay:[35]

Author	Male	Female
Courty	1	: 10
Duncan	1	: 8
Noeggerath	8	: 14

Kehrer, in 40 sterility cases, found the man at fault in 35% of the cases.

Samuel W. Gross[27] collected 192 cases from several authors, and found the man responsible in 17%.

Noeggerath claims that 90% of sterility is due to a latent gonorrhea contracted from the husband. After carefully going into this important question, both from the point of view of the male

and female, also from my own experiments with live gonococci and live spermatozoa, which I will set forth in detail later on, I believe that this latter statement is grossly exaggerated. My microscopic experiments with gonococci and spermatozoa will be given later when discussing all my experiments with spermatozoa, but I wish for the present to draw attention to some clinical facts which disprove this statement. We now know that chronic posterior urethritis in the male, which is the chief cause of chronic or so-called latent gonorrhea, is found in an enormous number of cases, according to some authors as high as 90%, and there are many authors, even, who claim that once the gonococcus gets into the prostate it can never be removed and will always be a source of infection later on. Add to this the fact that accurate statistics show that over 80% of all adult males have had gonorrhea at least once, and we can then appreciate that the number of primary and one-child sterility cases would be much greater than it actually is, if *Noeggerath's* theory were true. As a matter of fact, the largest number of my sterility cases were not due to gonorrheal infections at all, but to infantile uteri and acute anteflexion of the uterus.

While, on the one hand, the statement of *Noeggerath* is exaggerated, I believe the statistics of most authors assign a much too low percentage to the male (*Duncan,* 12%, *Courty,* 10%), and for the following reason already mentioned at the com-

mencement of this work. All these authorities base their deductions on statistics derived from the findings of live spermatozoa in the condom. As we have shown heretofore, however, such conclusions are erroneous. I have seen quite a few number of cases in which the spermatozoa found in the condom were absolutely all that could be desired, while at the same time the husband suffered from hypospadias and not one spermatozoon ever reached the cervix, and he was therefore responsible for the sterility. In other cases the husband had a tight stricture of the urethra. Here, again, live spermatozoa will be found in the condom. But on account of the stricture, the semen is not at all ejaculated, but dribbles away after coitus when the penis becomes flaccid. There are many more conditions of the male sexual apparatus, both organic and functional, in which live spermatozoa will be found in the condom, but are unable to reach the cervix.

The above two illustrations, however, are sufficiently striking examples to show that the mere finding of live spermatozoa in the condom does not absolve the husband from blame. This fact has more than a theoretical interest, for my histories show that many women are subjected to needless operations on the verdict of the condom. The question becomes even more serious since it has been advised (and properly so in the right cases) to perform laparotomy in order to examine the tubes and ovaries in cases of sterility where no

cause for it can be found in the ordinary vaginal examination. It is evident, therefore, that before operation is resorted to, the question as to which is the guilty party ought to be decided beyond the shadow of a doubt whenever possible. In many of the ordinary operations for sterility, the excuse is often given that there are other indications for operation besides sterility, and that a curettage and dilatation would be good anyway for a narrow os or an anteflexion, at any rate it can do no harm; but in the cases just cited the condition is very different. Here the examination discloses normal organs on vaginal examination, and we only open the abdomen on a suspicion that there might be something abnormal there to account for the sterility.

Brothers,[10] in a very interesting paper on sterility, found the husband at fault in 20% of his cases. He says: "In my records I find notes of 72 healthy women whose husbands were examined or sent their semen for examination. To account for this apparently small number of men, I will state *that where the wife presents lesions of the genital tract sufficient to easily account for sterility I consider it superfluous to subject the husband to examination.* Generally, such women suffer from other symptoms which justify treatment without regard to a single symptom of sterility; so that, roughly speaking, *only once in every four cases is it necessary to take the husband into consideration.*" (Italics are mine.)

Brothers' statistics are based on his private notes of 250 cases. He admits that he examines the man in only one-fourth of the cases. In other words, the mere fact that a man marries a woman with a conical cervix, an anteflexion or any other condition which, according to the author, might cause sterility, is enough to put him down as a normal man. In his statistics he considers all the other 75%, whom he has not even examined by the condom method, as absolutely normal. To quote further:

"Of the 72 men examined, 22 were pronounced healthy as far as the elements of potency and fructification were concerned. The other 50 were held responsible for the barren wedlock. In other words, one out of every five husbands (50 out of 250, or 20%) were responsible for the sterility."

To repeat, he takes 250 sterile couples. He does *not* examine 178 of the males because their wives have some genital trouble, and concludes that these 178 are all right. He examines 72 of the males and finds 50 (an enormous percentage) of them abnormal, and therefore puts down 50 out of 250, or 20%, of the cases of sterility as due to the male.

When I read these statistics, I was struck by the fact that, in spite of their imperfection, such a comparatively high percentage of responsibility should still be attributed to the male. The explanation became very clear, however, when I read his analysis of the 50 cases in which he considered the

male the responsible factor. His analysis is as follows:

	Cases
Congenitally undeveloped testicles	1
Double epididymitis	3
Syphilis	1
Gleety or gonorrheal discharges	6
Impotence, complete or partial	5
Complete absence of semen	1
Complete absence of spermatozoa	25
A few and feeble spermatozoa	8
Total	50

We note that even in these cases the semen was not examined in every case. In fact, the author expressly states that he did not examine the semen in all of them, but that he examined either the male or their semen. Now, at the very commencement of this paper, I have laid great stress on the point that the only positive way of determining potency of the male is his ability to deposit healthy spermatozoa in the cervix of the female. The mere fact of a man having had a double epididymitis, a chronic gonorrhea or syphilis is not to be taken as absolute proof of his inability to procreate. In fact, syphilis more often causes abortions than sterility, and the relationship of gonorrhea to sterility will be fully discussed later on when giving my experiments with live gonococci and live spermatozoa. The author referred to has therefore made another very serious error in his deductions

and statistics in at least 15 of the 50 cases cited, by making the man responsible for the sterility when there was absolutely no proof of it; but this error counterbalances the previous one, in which he puts too little blame on the male, as he had assumed the husbands healthy without examination, and the final result is therefore a little nearer the truth than otherwise it would have been had but one mistake been made.

As already stated, out of 250 cases in about 180 the author did not think it necessary to examine the male because of the conditions found in the female. He also gives us an analysis of these 180 cases, and I think it profitable to quote him again:

"In 180 women, who were considered responsible for the trouble, the causes of the sterility were classified as follows:

GENERAL CONDITIONS.

	Cases
Obesity	7
Alcohol and morphin habitue	1— 8

PELVIC PERITONEUM.

Pelvic abscess	1
Pelvic tumor(?)	3
Pelveo-peritonitis	14—18

ADNEXA.

Undeveloped ovaries	6
Ovarian tumor	9
Salpingo-oophoritis	28
Pyo-salpinx	7—50

CERVIX AND UTERUS.

	Cases
Pinhole os	5
Conical cervix	1
Stenosis cervical canal	22
Undeveloped uterus	14
Retrodisplaced uterus	22
Anteflexed or anteverted	7
Prolapsus uteri	2
Fibroids	5
Endometritis and endocervicitis	15—93

VULVA AND VAGINA.

Unruptured hymen	1
Vaginal bands	1
Vaginismus	3
Gonorrheal vaginitis	6—11
Total	180"

It is not necessary to call attention to every error in connection with the various items in this statistical record, as they will be readily noticed by the reader at a glance. Take, for instance, the very first item (obesity); it seems remarkable to put down in one's record and to quote it as a matter of statistics, that because a man has a fat wife and because no children are born to the couple, that of itself is enough to blame sterility on the wife without any further investigation and also to put down the husband as normal. The same is likewise true of many of the other conditions mentioned in the table; but it is unnecessary to continue this discussion.

I have gone rather extensively into the analysis of this otherwise very excellent paper on sterility, merely to show how some gynecologists handle the subject, for it must be remembered that this very paper was written about ten years ago by a very excellent gynecologist, who not only had a very large private and dispensary practice, but was also professor in one of our largest medical colleges.

That the number of cases of mistaken responsibility caused by the verdict of the condom is not so small as to be merely of theoretical interest, will be presently shown by comparison with my own statistics. *Kehrer* gives a larger percentage than most authors, but as his observations were based upon only 40 cases, they could not command very much respect.

I have made 450 examinations in 201 sterility cases. Of these 450 examinations, 205 were condom specimens, and 216 were examinations of various parts of the female genital tract for spermatozoa, while 29 were aspirations of the male's testicles for spermatozoa. Out of these 201 sterility cases, in all but 57, where the condom specimens showed normal spermatozoa, was the responsibility fixed by the finding of live spermatozoa within the cervical os. In other words, wherever the condom always showed an absence of spermatozoa, or always dead spermatozoa, the blame was put upon the husband. If the condom showed live spermatozoa, I investigated to see if live spermatozoa

could be found in the cervix or fundus. If found there, the husband was absolved from all blame; if not, further examinations and experiments were made and the responsibility placed accordingly.

In 57 of my cases the patients only made one visit, and I therefore had no opportunity for making the cervix test. Leaving out these 57 cases in which the condom findings could not be corroborated by those of the cervix, and also 15 cases in which the condom finding was in doubt (because dead spermatozoa were found in the condom, but it was evident that the specimen had been allowed to become frozen, and no other specimen was brought), there yet remain 129 cases, which were subjected to the closest scrutiny. In these I found that the male was at fault in 76 and the female in 53 cases, thus fixing man's responsibility as at almost 59% and woman's at about 41%, as the result of the cervix test. Even if we include all these 57 cases in which the condom specimen showed normal spermatozoa, but in which I had no opportunity to make the cervix test, as healthy males, and lay the blame in each of those cases on the female, we would still have the man responsible for about 41% of the sterility cases, as judged by the combined cervix and condom tests. Even this figure gives man about twice the responsibility that we find assigned to him by most authors, who merely judge by the verdict of the condom. It is needless to say that where I found the man at fault I made repeated examinations to be certain of it, and

where I found no evidence of spermatozoa in the female genitals, I examined the condom specimen also to see whether the testicles produced spermatozoa.

There are some authors who, in their statistics, put down to the male's responsibility cases of pus tubes, diseased adnexa, etc., in the female, which were caused by infection from a latent gonorrhea in the male. Thus *Engelmann* includes all cases of disease in the female which are directly traceable to the male, and thereby fixes man's responsibility at 25%. This method has the advantage of calling attention to the seriousness of a man marrying before his gonorrhea is perfectly cured. Of course, in preparing statistics, it all depends from what standpoint we look at sterility. If we are to consider who was the cause at the time of marriage, that is to say, if we take the stand that the woman would probably not have become sterile had she not married a man with a chronic gonorrhea, then it would certainly be proper to include diseased adnexa, etc., in the female as sterility due to the male.

In my statistics, however, I have only considered the question which party is causing the sterility at the time the couple comes to me for advice, without reference as to what caused the condition. I have taken the position, that at the time of examination, the man if married to any other healthy woman would probably be able to impregnate her, whereas the woman could be married to a healthy

man and still not be able to become pregnant. At the time of examination, it is immaterial whether the diseased adnexa in the woman was caused by a gonorrhea contracted from her husband, or from any other source; the fact is, that at that particular time she is the cause of the sterility. Were I to have taken the other view my statistics would have shown a still greater percentage for man's responsibility for sterility.

It should be remarked, however, that even at the best we assign to the male the *least* possible percentage of responsibility. All that can be said in favor of the cervix method of fixing the responsibility as compared with the condom method is, that it is more accurate and is probably the best we can do in the present state of our knowledge. The *absolute* fixing of the responsibility can, perhaps, never be accomplished. Man has the advantage, in that the secretion of his sexual organs can be examined and its potency determined, while there is no method known at present for the examination of, or the determining of the potency of the female ovum. We have adopted the Anglo-Saxon method of pronouncing judgment in case of the man, and the Roman method with respect to the female. In other words, we consider every man innocent until he is proven guilty. As long as he can deposit live spermatozoa in the female genitals he is considered normal. But with the woman it is different. A woman is considered responsible for the sterility until she has proven the contrary.

Given a woman with everything found *normal* on examination, we still consider her responsible for the sterility if the husband is found normal.

If there could be found a method of determining the potency of the ovum, and the permeability of the tubes, as well as the ability of the uterus to support a growing fetus, and then hold man responsible in every case where we found the woman normal, our statistics of man's responsibility might read entirely different than at present. Certain it is that there are cases of sterile couples, in which both parties married subsequently, and children were born. In such a case, according to our present method of reasoning, the woman would have been put down as the cause of the sterility, whereas in fact neither party was responsible. In countries where polygamy is allowed, the man could easily test his ability on different wives, and thus come nearer the truth; but in our country all we can say at present is, that the method outlined above is the best that can be done at our present state of knowledge.

CHAPTER X

Studies in Spermatozoa—Influence of Chemicals and Secretions Upon the Vitality of Spermatozoa—Author's Experiments and Observations—Gonococci and Spermatozoa—Motility of Spermatozoa—Quotations from Various Authorities—Author's Observations.

STUDIES IN SPERMATOZOA

I will now take up the study of spermatozoa proper, and in doing so will give some of my own experiments and investigations. While I have gone over many of the experiments of other writers and in a good many cases confirmed their findings, I will attempt to show that in a few instances my observations disagree with certain statements which seem to have been copied from one text-book into another, without investigation or challenge.

The first subject that will be considered here is:

THE INFLUENCE OF CHEMICALS AND SECRETIONS UPON SPERMATOZOA

Water generally destroys spermatozoa; but, according to *Ultzmann*,[71] concentrated solutions of salts, sugar, albumin and urea can revive these motionless spermatozoa.

Normal saline solutions prolong their power of motility for some time.

Alkalies, such as solutions of potassium and sodium, also favor motility. If spermatozoa are motionless, the addition of weak alkalies may excite them into action.

Acid and acid secretions, such as urine, kill spermatozoa.

Prostatic Secretions.—Motionless spermatozoa can be made to exhibit motion if a drop of prostatic secretion obtained by massage be added thereto.[22]

If we desire to study the effect of chemicals or secretions upon spermatozoa which have been removed from the female genitals, it is better to observe such effect upon the *edge* of the cover-glass, as most chemicals permeate very slowly, if at all, through the mucus.

SOME OF MY OWN EXPERIMENTS AND OBSERVATIONS

Live spermatozoa, from a case in which the spermatozoa in the specimen were dying, were greatly enlivened by the addition of semen from another case in which there were originally only very few spermatozoa.

In a specimen in which the spermatozoa were fairly active, this activity was greatly increased by the addition of fluid obtained by aspirating the testicle of another patient, although this testicular fluid contained only a few lively spermatozoa.

In a specimen in which the spermatozoa were almost dead, they were greatly enlivened by the addition of testicular fluid (obtained by aspiration of the testicle) from another patient.

Spermatozoa which were almost dead, were enlivened by the addition of normal salt solution, but not nearly as much as by the addition of testicular fluid.

Semen in which no spermatozoa were found was added to semen in which there were live spermatozoa without killing the latter.

Catarrhal secretions of the uterus very often kill spermatozoa; sometimes they do this simply because the reaction of the mucus has been changed from alkaline to acid, and by simply giving an alkaline douche we artificially overcome this acidity, and live spermatozoa are again found in the uterus; at other times, as in the case of Mrs. A. D. (pages 143-145) (Examinations 66, 67, 68, 69, 70, 71, 72 and 73), we may artificially change the reaction back to alkaline, but still the spermatozoa are killed, showing that there is something besides the change in the reaction which killed the spermatozoa. In this case a curettage not only caused live spermatozoa to be found again in the uterus, but the reaction remained alkaline without artificial help.

As shown in the same case, an endocervicitis, caused by the application of a chemical irritant to the cervix, is enough to so change the secretion as to kill the spermatozoa.

I will now, in addition, describe some experiments I have made showing the influence of gonococci on live spermatozoa.

It has generally been assumed that the gonococcus is inimical to the life or vitality of spermatozoa. On this account *Brothers* did not investigate any further in sterility cases if he found the husband suffering from gonorrhea. Other writers have taken the same stand without explanation, simply considering it as an axiom.

While I was experimenting with spermatozoa, it was a common occurrence in my office to have several women, each with a condom for investigation. I generally have on hand also patients with acute gonorrhea, with much pus containing live gonococci oozing out of the meatus. I was thus well supplied with live spermatozoa and live gonococci. I have very often made the following experiment. To some semen containing live active spermatozoa I added some pus taken directly from the meatus of my gonorrhea patient and mixed them both on the slide with the platinum loop. *In no case did I see any diminution in the activity of the spermatozoa.* There was no doubt clinically that the patient from whom the pus was taken had gonorrhea, but for purposes of scientific precision, I later fixed the specimen (containing the pus and the semen) and stained it with *Gram's* stain and found typical gonococci. There was also no doubt that the gonococci were alive, at least for the little time it took to make the experiment.

I have repeated this experiment many times and always with the same result, so that I have come to the conclusion that the gonococcus itself does not harm spermatozoa, and would not cause sterility, except in so far as the inflammation which it causes has the effect of producing pathological changes in the male and female genitalia. Gonorrhea causes sterility, not because the reproductive organs are invaded with gonococci, but because pathological changes are brought about. It causes sterility in the male by producing a double epididymitis with occlusion of both vasa, or by tight stricture of the urethra, and in the female by causing certain forms of endometritis, pus tubes with occlusions, etc.

That the result of these experiments is also correct, clinically, is proven by the fact that a woman may be infected with gonorrhea and become pregnant at the same time. I do not wish to bring forward cases in which pregnant women are suffering from gonorrhea. Such cases would not be precise enough for scientific proof, because the woman might have become pregnant first and then become infected with gonorrhea. In other words, we could not positively say that she became pregnant and infected with gonorrhea at the same time. But there are enough medico-legal cases in which an unmarried female was raped and became infected with gonorrhea and pregnant at the same time. Here there certainly was only one coitus, and there came through the penis of the male live gonococci

and live spermatozoa at the same time without the gonococci interfering with the potency of the spermatozoa.

One-child sterility cases due to gonorrhea also show that it is not the gonococcus (for it is present during pregnancy) but the pathological changes caused by gonorrhea that make for sterility. This fact has more than a merely academic interest, but is of real practical moment. There are some physicians who at once put the blame on the male, because they notice some shreds in his urine or some morning discharge. It can therefore be not too emphatically emphasized, as has been so often repeated in this treatise, that the only test of responsibility for sterility, as far as the male is concerned, is his ability of depositing live active spermatozoa in the cervix of the female, and if he fulfils this condition, he is not responsible, even if he is suffering from gonorrhea or shows signs of old epididymitis. As above stated, my statistics show that, with this test, man's responsibility in sterility reaches almost 59%.

MOTILITY OF SPERMATOZOA

I will now discuss some observations I have made about the motility of spermatozoa which seem to be at variance with the present accepted views. The question, I admit, is at present of merely academic interest.

It is generally considered that the motility of

the spermatozoon resides only in the tail. I will quote only a few authorities on this subject.

Howell,[33] page 894, says: "The adult ripe spermatozoon is characterized as an independent cell by its great motility, due to the cilialike contractions of its tail."

Dearborn,[18] page 440, says: "The spermatozoon is an independent motile cell, with a very long and active flagellum (tail). By rapid undulations of this flagellum the sperm is forced ahead."

Brubaker,[11] page 708, says: "The power of locomotion depends upon the possession of the tail, which, by lashing the surrounding fluid now in this and now in that direction, propels the head from place to place."

It is not necessary to quote more authorities. At one time I looked through most of our textbooks on physiology, and it seems that they all copied the same ideas, or seemed to accept without investigation the statement that the power of locomotion resides only in the tail of the spermatozoon.

After carefully watching very many spermatozoa for long periods, I have come to the conclusion that not only has the tail motility, but there also exists an independent motility in the head. This conclusion was arrived at for the following reasons.

If we watch a spermatozoon that is just about to die we will sometimes see the following phenomenon: the tail part will be dead and motion-

less while the head will make one or more motions from side to side (Fig. 1), showing that the head has some power of locomotion which has survived that of the tail.

FIG. 1.

Showing independent movements of head of the spermatozoon.

I have also seen the head and upper part of the tail make various independent motions while the rest of the tail remained quiet in one position (Fig. 2). The impression I received when watch-

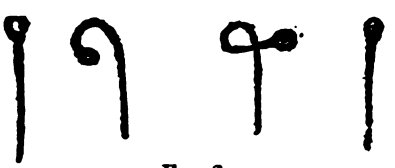

FIG. 2.

Showing independent movements of head and adjoining tail-piece of the spermatozoon.

ing this phenomenon was, that the head moved independently and pulled the adjacent portion of tail with it. One would also imagine that if the tail alone possessed all the power of motility and simply propelled the head, that the most motion would be exhibited at a point furthest from the head, that is, nearer the end of the tail, and the

nearer you got to the head the less motion there would be. Such is, indeed, the appearance if we watch the ordinary movements of the spermatozoon; the entire cell is paddled in either direction by the movements of the tail and the head and adjacent tail-piece remain comparatively inactive. When, therefore, as in the observation just recorded the opposite takes place, we may infer that the motion originates in the head, and the adjacent tail-piece merely passively follows.

If one aspirates a healthy testicle in a manner presently to be described, and examines the fluid under the microscope, he will find, besides an occasional full-formed spermatozoon, numerous undeveloped spermatozoa, or tailless spermatozoa which exhibit very much motion—but remain at one place and do not dart across the field.

Again, what becomes of the spermatozoon after it has entered the ovum? *Howell*[33] says on page 883: "The spermatozoon consists of three essential parts, the head, the middle piece and tail. The last named is the organ of locomotion, and after the spermatozoon enters the egg, this portion atrophies and disappears, probably by absorption. . . . *On entering the egg the head moves toward the nucleus of the latter.*" (Italics are mine.) I am aware that some authorities, upon no evidence whatsoever, believe that the union between the head of the spermatozoon and the nucleus of the ovum is brought about by an attractive force of the nucleus, which pulls the spermatozoon toward it. But most

authorities believe that the head moves toward the nucleus without any attractive force.

Brubaker,[11] on page 709, says: "Notwithstanding their enormous numbers it is generally believed that but a single spermatozoon effects an entrance into the ovum. With the accomplishment of this, however, the spermatozoon loses its vitality, after which the body and tail disappear. *The head advances to meet and unite with the nucleus of the ovum.*" (Italics are mine.) If, therefore, the spermatozoon can move before it has a tail, and we now see that it can move after it has lost its tail, there is no reason why the head cannot move with the tail attached. As already stated, however, this entire question is merely of academic interest.

According to *Ultzmann*,[71] in spermatozoa which have died gradually after ejaculation, the tails are outstretched (straight) or at most slightly curved, while in those that have been discharged motionless (dead) the tails are either rolled up in a spiral or are bent.

One recent writer on sterility has made observations upon the length of time spermatozoa remain alive on the slide, and draws conclusions from these observations as to the potency of the spermatozoa in the particular case under investigation. I have also made numerous observations and experiments along the same lines after reading the paper, but cannot agree with its author. From my observations I do not believe that the length

CHAPTER XI

Aspiration of Testicles—Technique—Author's Statistics.

ASPIRATIONS OF TESTICLES—TECHNIQUE

The testicular region is sterilized in the ordinary way. A hypodermic syringe, to which is attached either a small size aspirating needle or a larger size hypodermic needle with large calibre, is also sterilized. The needle must not be cooled off in any antiseptic solution, but when taken out of the soda solution in which it has been boiled, must be allowed to cool in the air, and when ready the needle (with syringe attached) is plunged into the body of the testicle which is held firmly by the other hand of the operator. Suction is then applied by pulling the piston of the syringe in the ordinary way of aspiration and this suction-action is kept up while slowly pulling the needle out. When the needle is out, however, we do not expel the air as in giving hypodermic medication, but rub the point of the needle directly upon the glass slide, and if no wetness is seen we expel a drop of fluid from the barrel of the syringe, just enough for one examination. This point in the technique is extremely important, for at times the spermatozoa are not sucked into the needle at all, but seem to

adhere to its point, and if we were to expel the air from the needle as in the ordinary way, we would at times lose all the spermatozoa. If the point of the needle and the first drop do not show any spermatozoa, we expel another drop and so on till we have either found them or examined all the fluid aspirated. Sometimes we may have to search a very long time before we find any, but when we do find one, we generally find a good many in the neighborhood. It seems that all the spermatozoa obtained in any specimen are found in the same field. In some cases we do not obtain any fluid for examination at all.

Aspiration of the testicles, while not a dangerous procedure by any means, should not be undertaken lightly. The pain is sometimes very intense, and is real testicular in character, that is to say, anesthetizing the skin beforehand does not help any. The pain is felt more often along the spermatic cord and at the internal ring than at the point of puncture. It sometimes lasts an entire day, and in a markedly neurasthenic patient of mine, it actually lasted an entire week. I have seen one or two cases with marked shock, vomiting and faintness following the puncture. As already stated, however, I have never seen any bad results following the puncture. It is well to caution the patient, before making the puncture, that there may be some pain, as I have had cases where the patients drew out the needle as soon as it was inserted and before I had a chance to aspirate. I never deem it

advisable to aspirate both testicles at the same sitting or to make more than one puncture at the same sitting, even if no spermatozoa are found, although I have done so in an exceptional case, without harm resulting. A few patients do not seem to mind it at all, but most patients will only allow you to aspirate once, no matter how anxious they may be to get well.

It is for the reasons just given that I have had very little opportunity for aspirating the testicles of perfectly normal individuals. I have also made a search of the medical literature on the subject, but could find nothing upon the topic of aspiration of the testicles, either in normal or pathological cases, so that I have no data except my own to go by. Thus far I have performed aspiration of the testicle 54 times, of which 28 were in male sterility cases (in all of whom no spermatozoa were found in the condom) and 26 in cases from my genito-urinary clinic with patients suffering from various genito-urinary diseases. (A complete list of my work in this connection in the non-sterility cases, as well as the examination numbers of the aspirations in the sterility cases will be found on pages 235-238, under the title "Aspirations of Testicles.") The dispensary cases for the most part were unmarried young men suffering from genito-urinary diseases, and so although I refer to them as non-sterility cases to distinguish them from sterility cases, there is no way of telling whether these young men are sterile.

It must be distinctly understood, however, that while in a condom specimen which has not been allowed to become cold and which is examined shortly after coitus, the finding of motionless spermatozoa means that such spermatozoa are dead, this is not the case with the spermatozoa found in the aspirated testicular fluid. While, as I have pointed out, the statement made by some authors that spermatozoa do not show motility until they have left the testicle, is incorrect; because I have found moving spermatozoa in the aspirated testicular fluid, I do not mean to imply by any means that all the spermatozoa in the testicle show evidences of motility. Far from it; the number of moving spermatozoa found is very small in the aspirated fluid, but we do find many spermatozoa with straight tails, which do not exhibit motion, but which must not be considered dead. These are simply spermatozoa which have not as yet moved, and about which we cannot say at present whether they would have moved if ejaculated in the regular way under the stimulus of the prostatic and other secretions of the sexual glands. It is for this reason that I have reported them in the histories as motionless spermatozoa and not as dead spermatozoa.

My 26 examinations of non-sterility cases were made on 25 patients, and in these I found spermatozoa in 60% of the cases. In 16% I found moving spermatozoa, and in 44% motionless spermatozoa. My impression (as far as any deductions can be drawn from only 25 cases) is, that in normal in-

dividuals spermatozoa ought to be found in almost every case in the aspirated testicular fluid. My reason for this assertion is based on the fact that I found spermatozoa in 60% of my genito-urinary cases, in all but one of which I made only a single examination, and in many of the cases in which no spermatozoa could be found there was sufficient cause for their non-existence at that particular time because of the disease from which the patient was suffering. Looking at my negative cases, I find that the patient in one case was suffering from a syphilitic orchitis, in another case the patient had an active secondary syphilis, with the rash all over the body at the time of examination. In still another, the patient (a married man) was suffering at the time of examination from a very acute gonorrhea in the third week. In this case the man's wife had given birth to 2 children, showing that if his testicle had been examined at another time we would probably have found spermatozoa. In 3 other cases of acute gonorrhea and in 3 cases of chronic gonorrhea no spermatozoa were found. In one case of acute epididymitis I could also find no spermatozoa.

But on the other hand I found motionless spermatozoa in one case of tubercular testicle, two times motionless spermatozoa in cases of sexual neurasthenia (impotence), once motile spermatozoa in a case of acute epididymitis, and in another case with the same trouble, there were also motionless spermatozoa. Finally, I found 3 times motile and

6 times motionless spermatozoa in gonorrhea cases.

As above stated, if we consider the fact that only one examination was made, and also consider the condition of these patients, and the fact that we found spermatozoa in 60% of them, I believe that spermatozoa ought almost invariably to be found in the testicles of normal adults. Coming now to my sterility cases, I cannot report such good results here. I have made only 28 aspirations, but examined only 21 of them, as the rest were injected directly into the cervix in a case to be described presently. These 21 examinations were made on 13 cases, in all of whom, it must be remembered, repeated examinations failed to discover any spermatozoa in the condom or semen taken from the genitals of the wife. In this small number of cases (too small to draw any conclusions from) I could demonstrate spermatozoa in the aspirated testicular fluid in only 38½%, of which 15½% showed motile and 23½% motionless spermatozoa.

In other words, in the most hopeless cases of azoöspermia, spermatozoa can be found in almost 2 out of every 5 cases, and motile spermatozoa in a little less than every 6th case. It must be mentioned, however, that in most of these cases 2 and sometimes 3 examinations were made, but it is significant to add, that in 8 out of the 9 cases in which no spermatozoa were found, they were never found in either testicle if the first examination did not discover any. In one case only did I find sper-

matozoa where two examinations were made, absent at the first examination, and present at the second. In all the other cases, I found that if spermatozoa were absent on the first examination, they were also always absent upon subsequent examinations. My negative cases show 4 with old double epididymitis, one case of cystic testicles, one with atrophic testicles, and 2 cases with nothing abnormal to be felt on palpation.

CHAPTER XII

Azoöspermia—Hopelessness of Condition—Condition Improved at Times by Treatment of Prostatic Urethra—Importance of Dead Spermatozoa—Author's Method of Treatment—Statistics of *Martin's* Operation.

OBSERVATIONS AND EXPERIMENTS IN AZOÖSPERMIA

Azoöspermia (absence of spermatozoa from the semen) is one of the most hopeless conditions as a cause of sterility in the male. Thus *Ultzmann*[71] says that it is usually a permanent affection. *Samuel W. Gross* [27] says that in the large majority of cases little encouragement can be given as regards permanent relief. *Fürbinger* [23] says that the prognosis in double epididymitis is bad, and except in syphilitic cases nothing can be done. *Ultzmann* says furthermore that the treatment of male sterility is rarely accompanied with favorable results. Later on in the same work he makes the following statement: "A favorable result then, as a rule, is only to be expected in azoöspermia when it has existed no more than a year, counting from a preceding inflammation of the testicles."

In view of the general hopelessness of these cases, any new suggestion as to treatment should

be welcome. In a few cases I have obtained a favorable result as regards the reappearance of spermatozoa in the condom, by prolonged treatment of the posterior urethra with deep urethral instillations of weak silver nitrate solutions and the treatment of the prostate by massage. This treatment must be continued for at least 6 months, but it has the advantage that it does not interfere with any subsequent more radical treatment, should such become necessary. In one case in which the condom specimen showed dead spermatozoa only, live spermatozoa were found in the condom after only 6 weeks treatment, and *numerous* live spermatozoa were found later on. In another case, in which very many condom specimens were examined in the course of several years and always with negative result as regards the finding of any spermatozoa whatever in the semen, there appeared dead spermatozoa in the condom specimen after 9 treatments covering a period of 14 weeks.

Now, the finding of dead spermatozoa may not mean very much, but we must remember that if the vas is patent enough for the passage of dead spermatozoa there is no reason why live spermatozoa cannot come through also. It is possible that in some cases of azoöspermia due to double epididymitis and supposed occlusion of the vasa, the trouble may not be due to any occlusion whatever but to the altered secretions of the sexual glands which are inimical to the existence of spermatozoa, or to the condition of the testicle which, on account

of disease, no longer produces them. It seems to me that if dead spermatozoa are found in the condom specimen even at very long intervals, this alone would argue against any real occlusion of the vasa. Again, as my experience with aspirations of the testicle shows, in quite a few of these cases no spermatozoa could be found in the aspirated testicular fluid. At any rate, even if later on we have to resort to a more radical method of treatment, such as epididymo-vasostomy, the preliminary treatment of the deep urethra and prostate can only improve the chances of impregnation.

In another case of hopeless azoöspermia, I have experimented with an entirely new method of treatment which I devised and which I wish to record here at this time, although it is still merely in the experimental stage. Thus far I have had opportunity to test it in only one case, but unfortunately the patient lived out of town and discontinued treatment before any result was achieved. My chief object in recording it, however, is that other physicians, who have similar cases, may try it, and the right combination of treatment may then possibly be discovered. This method of treatment is absolutely harmless and also has the advantage of not interfering in any way with a subsequent radical operation.

The case referred to never showed spermatozoa in the condom, except on one occasion when one dead spermatozoon was found. The aspirated testicular fluid, however, showed live motile sperma-

tozoa. My method consisted of injecting the aspirated testicular fluid directly into the cervix of the wife. Several interesting questions arose during the process of experimentation, but as such experiments had never been made before, I had to try several methods.

My first attempt was made by injecting the aspirated testicular fluid, mixed with a weak warm solution of bicarbonate of soda, into the cervix, one day after the cessation of the menses and 6 days after the last coitus.

My second experiment consisted in injecting the fluid undiluted into the cervix directly after the close of the menses and 5 days after the last coitus.

My third experiment consisted in injecting the combined testicular fluid of *both* testicles undiluted into the cervix 4 days after the commencement of the period and 9 days after the last coitus.

As none of these experiments turned out successfully, inasmuch as the wife had her periods at the regular time, I thought that a result might be obtained by making the experiment before the periods instead of after the periods, as even in normal coitus we are not certain whether the best time for impregnation is before or after the menses. I thought that it might also be advisable to inject with the testicular fluid the secretions of the prostate gland and seminal vesicles as obtained by massage of those parts per rectum.

My fourth experiment was made 3 days before the expected period and 8 days after the last coi-

tus. It consisted of injecting into the cervix a mixture of the massaged prostatic fluid and the aspirated testicular fluid. The wife nevertheless had her period 2 days after the experiment.

My fifth and sixth experiments were made in the same way, except that the one was made a few days *before* the period, and the other a few days *after* the period. The patient then discontinued treatment.

I shall continue making similar experiments, however, trying various combinations, and I hope that other physicians will work along similar lines also. If the successful method of procedure should finally be discovered, it would not only be of value in affording a harmless method of relief in what at present is an almost hopeless condition, but it would also throw considerable light upon certain obscure questions of the physiology of impregnation. For instance, if it should be found that the experiments are uniformly successful if the injections are made after the menses, or vice versa, it would at once settle the question as to what is probably the best time for coitus for purposes of impregnation. (Of course, this method differs from normal coitus and that fact must be considered before drawing any conclusions.) It would likewise settle the question whether the prostatic fluid, or any other secretion is absolutely necessary for impregnation.

Finally, and as a last resort, we may recommend the operation of epididymo-vasostomy. Be-

fore recommending it, however, we must be certain that the testicles produce normal spermatozoa. The results thus far have not been very encouraging, and I have spoken to many surgeons who have given it up entirely on account of their uniform failures. *Martin*,[44] in 1909, reported 15 cases, in 6 of which spermatozoa were found in the condom after the operation and in 3 of these cases pregnancy followed. It is possible that if the cases were selected and the condition of the testicle were first ascertained by aspiration, an even higher percentage of success may result. At any rate the patient is left no worse than before, and any result at all is of value in these cases.

CHAPTER XIII

Technique of Recovering Spermatozoa from the Female Genitals.

Spermatozoa may be recovered from the vulva regions, the vagina, the external os, the portion of the cervix just within the external os and the body of the uterus. For reasons given at the commencement of this work it is impracticable and dangerous to try to obtain them in the ordinary way from the Fallopian tubes or from parts beyond. I have recovered spermatozoa from the genitals between one hour and seven days after coitus. In most cases, and especially at the first examination, the sooner after coitus the patient is examined, the better.

Before the examination is to commence, it is well to have everything in readiness, to wit, the microscope, the alcohol lamp, the platinum loop and about 6 slides and cover-glasses cleaned and ready for use; also some long wooden applicator sticks without cotton on them. There should also be ready beforehand: vaginal blades, or a bivalve speculum, a uterine sound, a strong bullet cervical forceps, a uterine dressing forceps, a sponge holding forceps, and a syringe to be described later.

All these should have been sterilized and kept in warm (not cold) alkaline solution, such as the ordinary soda solution in which the instruments are boiled.

For wipes it is advisable not to use cotton, as the fibres stick on to the parts and to the platinum loop and are liable to get mixed up with the specimen, thereby interfering with the microscopic examination. Small pieces of gauze or small gauze pads are the best for wipes. As a general rule, it is not necessary to heat or warm the slides or cover-glasses. It is very desirable, almost essential in fact, that the microscopic examinations be conducted in the same room where the patient is. For careful work or in doubtful cases it is also advisable to employ a cover-glass over the specimen. It is true that very often the spermatozoa are so numerous that one can focus right on the slide and see them, but if we wish to study them, or if they are not so numerous, we ought to employ a cover-glass, especially as the piece of mucus which we sometimes obtain from the cervix is often very thick and needs to be flattened out with the cover-glass.

It is likewise important to be exceedingly gentle in procuring the specimens, especially when we are trying to obtain them from beyond the cervix, or in cases of erosions of the cervix to avoid any bleeding, because the slightest amount of blood on the specimen makes the finding of spermatozoa exceedingly difficult or even impossible. Sometimes a bleeding may spoil all the specimens and

make it absolutely impossible to make any examinations at that time.

It is advisable also to examine each specimen immediately after it is obtained, and not to take specimens at one time from all portions of the genital tract, and then examine one after the other. Very often the specimens dry quickly, especially if the portions of cervical mucus are very thick or tenacious, so that it is advisable to examine them at once, and systematically go over the entire genital tract, examining each specimen as it comes out. If we take the precaution to allow the patient to stretch her legs occasionally, especially while we are examining the specimen under the microscope, the patient will not complain of the length of the examination.

When the patient is seen for the first time and we know nothing about her, we can begin by taking with the platinum loop some secretion from around the urethra and clitoris. If the examination is made shortly after coitus, we very often find numerous spermatozoa in those regions, mostly dead, but many live ones also. The longer after coitus the examinations are made the less likely are we to find them here, especially the live ones. After each specimen is deposited on the slide the platinum loop is passed through the flame in order to avoid mistakes in interpreting from which part of the genital tract the spermatozoa have been procured.

We next carefully insert a pair of vaginal

blades, in which case an assistant is necessary, or else we carefully put in a bivalve speculum which may be done without an assistant. No lubrication is used on any of the instruments.

If the examination is made a short time after coitus, we will often see at the posterior fornix and also on the lower blade of the bivalve speculum a pool of semen very rich in live and dead spermatozoa. If the platinum loop does not reach in far enough, we may use an ordinary long applicator stick and then rub the end of it on the slide. I have made many examinations in this way with perfectly satisfactory results.

Next, with a stick or the loop, take a specimen from the cervix. Then with a gauze pad wipe off the cervix and insert the loop just within the internal os and get a specimen from there; after this wipe out the internal os and cervix as much as possible and with the loop or the stick or a uterine sound curved in the proper way get spermatozoa from the interior of the uterus and sometimes with a patent os we can even reach a way up to the fundus. For wiping out the cervix, the best thing is a wooden applicator, around which cotton has been tightly wrapped and fastened with collodion, so as not to have any loose fibres.

In some cases it is necessary to pull down the cervix with a tenaculum forceps. If this has to be done we must be careful not to insert the forceps within the cervical canal. Also, it is not advisable to take hold of the cervix above the os, be-

cause the bleeding which may be caused would run down onto the os, and interfere with the taking out of mucus from the os for examination. I generally insert the forceps between the os and the lower margin of the cervix. In some cases we can also dilate the cervix gently, either with a regular dilator or with the uterine dressing forceps.

It is in these manipulations in trying to obtain specimens from beyond the cervix that we must be extremely careful in our wipings and dilatations, so as not to cause any bleedings. It is needless to say that our asepsis must be perfect, especially if we go into the uterus, but if so, there is absolutely no danger in the manipulations. It must be emphasized also that we cannot obtain specimens from the interior of the uterus in every case by any means. There are any number of cases with extreme anteflexion, in which the body is bent almost at a right angle over the cervix, where before operation we cannot get a sound past the anteflexion and in such a case it is ridiculous to expect to obtain a specimen from the fundus.

There are other cases also where the os is pinholed, though some of these may be gradually dilated in the office after several sittings. There are still others that bleed at the slightest touch and in which it is difficult to obtain satisfactory specimens, and so on.

It may be objected that the finding of spermatozoa in the body of the uterus, or even within the cervix, is not absolute proof that they got there by

themselves, for no matter how careful we are, we cannot in any case be sure that we did not push them in with the sound, or that in withdrawing the sound its end may not have become contaminated with spermatozoa from outside the body of the uterus or the cervix. This idea, though plausible at first blush, is not *necessarily* a true objection. I admit that when we find live spermatozoa all along the genital tract we cannot scientifically assert that, when the sound or loop is withdrawn and rubbed on the slide, the spermatozoa thereon came from the uterine fundus. But if we make several examinations from the various parts of the genital tract, and find no or only dead spermatozoa in the vulva, vagina and various parts of the cervix and then push our sound easily up into the fundus and find live spermatozoa there, we can practically say, that the spermatozoa found came from the fundus, if our examinations of the other portions of the genitals have been thorough. And this condition is not the exception, but the rule. The longer after coitus the examination is made the less likely are we to find live spermatozoa, or, indeed, any spermatozoa at all outside of the uterus and cervix. Those in the vulva, especially around the meatus urinarius, die within a few hours; those in the vagina are all dead at the end of one or two hours, and only exceptionally do we find any live ones after that time. It is only those that are protected in the interior of the cervix and body of the uterus that remain alive for several days, so that for sci-

entific study and also for accurate diagnosis it is necessary to make several examinations, some at least 2 or 3 days after coitus. As stated at the very commencement of this book, it may be set down almost as a truism that any spermatozoa found several days after coitus must have come from the uterus, for even if found in the vagina they were extruded from the uterus with the uterine mucus, as the result of endometritis, or have come out with the menstrual blood. The reasons for this belief have been given heretofore (see page 11) and need, therefore, not be repeated here.

To overcome the possibility of contamination with mucus from the cervix in looking for spermatozoa in the fundus of the uterus, I have devised

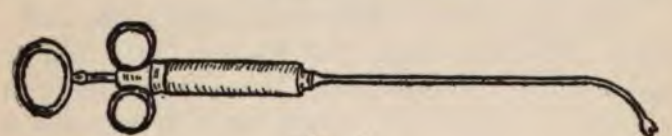

FIG. 3.

Author's syringe for obtaining spermatozoa from fundus of uterus.

(It is well to have the sound portion of the instrument made of silver, so that it can easily be bent at any angle to accommodate itself to the different curves in different uterine canals.)

a syringe (Fig. 3) in which the opening of the sound portion that goes into the uterus is situated in a slight depression, so that when entering the cervix the projecting wide portion of the sound pushes aside the mucus, and it is only when the sound portion has reached the fundus that suction

is commenced. In this way I minimize as much as possible the danger of contaminating my fundus specimen with cervical mucus. *Runge* [62] lays great stress upon the point (he uses an ordinary uterine syringe) that the instrument should be inserted with positive pressure, that is, with the piston of the syringe all the way in, for if introduced while under negative pressure the mucus of the cervix would be constantly sucked into the syringe. Of course, this may be followed, although with his syringe there is still danger of contamination, as portions of mucus are bound to adhere to the sound part of the instrument. I must admit, however, that no matter what instrument is used, we can never be absolutely certain that our fundus specimen has not become contaminated.

The microscope I have been using is the ordinary Leitz microscope, and I use a No. 4 ocular and No. 3 and 6 objectives. It is not necessary to use the oil immersion, unless we wish to make a special study of the more minute characteristics of spermatozoa. In examining specimens from the condom in normal cases it is not necessary to hunt long, as we see numerous ones at once moving around in rapid motion. As a matter of fact in the vast majority of cases if we do not see the spermatozoa at once, there are none present, as it is only exceptional, except in very abnormal cases with markedly diminished quantity of spermatozoa that we have to look for them. This applies only to the condom. When obtained from the genitals, how-

ever, we sometimes have to search some time, and if the examination is made 4 or 5 days after coitus and we are trying to find them in the fundus uteri, which is the only place we are likely to find them so long after coitus, we may sometimes have to search a very long time before we can decide that none are present. In cases where no spermatozoa are found in the condom at the first examination, it is proper to make several examinations after varying periods of continence, but in the vast majority of cases, if we do not find them the first time, we rarely find them afterward, at least not in sufficient numbers to be of any use.

CHAPTER XIV

Method of Procedure and Treatment of Sterility in the Male and Female.

Our method of procedure in a given case of sterility would be as follows: The wife presents herself as soon after coitus as possible, and we take specimens from the mucus of various portions of the genital tract as described above, and conclude as follows:

If live spermatozoa are found in the cervical mucus we can at once absolve the husband from all responsibility.

If dead spermatozoa are found in the cervical mucus it is safer to get a condom specimen to see whether the spermatozoa came out dead, or whether they were killed after they had entered the female by the secretions of the latter's genitals. If for some reason or other (as when the wife does not wish the husband to know that she is investigating the subject) we cannot get a condom specimen, we determine this point by the observations of *Ultzmann,* to wit, that when spermatozoa have been ejaculated alive and later died their tails are straight, whereas spermatozoa that have never moved have their tails curled up. If in such cases

we find the secretions of the vagina *markedly* acid and possibly also those of the cervix, we may order a phosphate of soda douche before coitus and will then sometimes find the spermatozoa alive at the next examination.

If after careful examination we find spermatozoa in the cervix but never beyond the internal os or angle of flexion in an anteflexed uterus, we may conclude that the flexion is the cause of the sterility as far as can be determined, and a dilatation and curettage is indicated then.

If we find lively spermatozoa in the body of the uterus we may conclude that no matter how acute the flexion, it is not the cause of the sterility. In all probability the sterility in such case is due to one of two conditions, either an undeveloped or infantile uterus, which cannot support a growing fetus, or to some trouble higher up, such as either a stenosis of the tubes or some ovarian trouble. The condition of the uterus can be determined from the local examination, with the caution that care must be taken not to depend entirely upon palpation, but to determine the size of the uterus by the uterine sound. Very often the uterus is so extremely flexed and doubled upon itself that to the examining finger it appears very small and infantile, but upon introducing a sound we find that the canal is, nevertheless, of proper length, and that the uterus only appears small. In determining the condition of the uterus by the uterine sound we must not be guided entirely by the length,

but must determine how much is cervix and how much body. We often find a long uterine canal by the sound, but on examination with the speculum see that almost the entire uterus is made of cervix with but a minute diminutive body. Such a uterus (unless the body can be developed) is obviously unfit for impregnation.

If, however, we find a perfectly well-developed uterus containing live spermatozoa several days after coitus (in the fundus), and nothing wrong is found on palpation in the adnexa, we may then conclude that there is some stenosis of the tubes or some other pelvic condition not appreciated by palpation, and it is then, and then only, that a laparotomy may be considered and be justifiable. The statistics of the cure of sterility by laparotomy are poor enough as it is, and ought not to be made worse, and the whole procedure discredited by operating before a distinct indication, as outlined above, presents itself. I believe, however, that if we operate only on cases as above indicated, the results will be much better than they are at present.

If we find dead spermatozoa in the body of the uterus, and live ones in the cervix, we may conclude that it is not the flexion that causes the sterility, as the spermatozoa have passed it, but that it is the condition of the uterine endometrium that has killed the spermatozoa. In all these examinations we must take into consideration the time after coitus the examinations are made. As stated above,

it is advisable to make the examinations as soon after coitus as possible. Sometimes, however, the patient does not appear until the next day, and then we may examine nevertheless, only making allowance for the length of time. In the above case a curettage would be indicated. We must also remember that the endometritis may be the result of a flexion or displacement of the uterus and direct our treatment accordingly.

If no spermatozoa at all are found in any portion of the genital tract, or only dead ones in the vagina, but none at all in the cervix, the fault may be either with the husband or the wife. We then request a condom specimen, and if live active spermatozoa are found therein, the fault may still be with the husband or with the wife. It may be the case of a normal penis with an abnormal position of the cervix, such as a long conical cervix, a very short cervix, or a cervix pulled out of position by adhesions or otherwise dislocated. Or there may be in the male organ a condition of hypospadias, epispadias, or stricture of the urethra, or any of the functional sexual disorders, such as premature ejaculation, etc. As long as no spermatozoa are found in the cervix it is always advisable to examine the husband, no matter what we find in the condom specimen.

If we find that the fault is with the husband, no operation should be performed on the wife, except if indicated for some other complaint aside from sterility.

If we find that the husband has normal spermatozoa in the condom, but is suffering from hypo- or epispadias or stricture, or functional sexual disorder, these should be remedied, if possible.

If on several examinations and after long periods of continence, there never are any spermatozoa in the semen at all, either dead or alive, the husband should be examined for signs of old epididymitis, atrophic testicles or tubercular testicles. It has been noticed that tuberculosis of one testicle causes an absence of spermatozoa from both testicles, and often the absence of spermatozoa precedes by two years the clinical appearance of the tuberculosis. Conversely, therefore, in every case of sterility in the male, without other obvious reason, we must suspect tuberculosis of the testicle. In the vast majority of cases, however, we will find signs of an old epididymitis, or the history of an acute epididymitis several years before. In rare cases we may find a syphilitic epididymitis which requires the regulation treatment.

If we are in the presence of an old chronic epididymitis of several years' duration, we ought first determine if either testicle secretes spermatozoa before we can suggest any treatment. We must remember that the sexual function (by which I mean that which determines the sexual passion) and the secretory function of the organ, are each entirely independent, and the fact that the man's sexual passion and ability is normal, does not imply that spermatozoa are secreted. In such a case,

therefore, we must first aspirate the testicle as described above, and examine for spermatozoa.

If no spermatozoa are found in the testicle after various periods of continence or immediately after coitus, I do not believe anything can be done for the individual, although it may not be wise policy to tell him so, as there are on record cases of suicide due to the fact that patients were told that they were hopelessly sterile. There are other reasons also which will readily suggest themselves why the patient should be kept in ignorance; but in any event he must be kept away from the quacks. I certainly would not advise operation in these cases. This is very important, as I know of one case where a prominent surgeon wanted to perform the operation of epididymo-vasostomy, where I had repeatedly found nothing but clear serum in the testicles.

If we do find live active spermatozoa in one or both testicles, we may attempt to treat the prostatic urethra by deep urethral injections, and also to massage the prostate. Although the authorities assert that nothing can be done in these cases, still, in a few I have seen a reappearance of spermatozoa in the condom. This method has the advantage that it does not lay the patient up, that it cannot possibly do any harm, and that it does not interfere with any more radical procedure that may be determined upon later on. If anything, it materially improves the chances. I am led the more to this conclusion because I have observed

that the more radical operation of anastomosis is mostly unsuccessful, and I, therefore, would not recommend it until other milder methods have been tried. If there is no reappearance of spermatozoa within 6 months of treatment, I think it may be abandoned.

In this latter condition and before recommending the operation of epididymo-vasostomy we may attempt the procedure I have recommended heretofore, namely that of injecting the aspirated testicular fluid directly into the cervix of the wife, either with or without the addition of prostatic fluid.

In the foregoing pages I have tried to outline the treatment of sterility in the male and female upon scientific principles, so far as our present knowledge permits. When we get more light upon certain obscure physiological problems the treatment may have to be changed. Yet one word more. We must never positively promise a cure, no matter how definite the pathological condition is. In the first place, the removal of an obvious impediment does not guarantee that some more serious impediment does not exist higher up, and in the second place there are cases of sterility where we can find absolutely nothing abnormal in either party (even on laparotomy in the female) and still for some unknown reason they remain sterile.

We also find cases where the parties separate and marry other persons, and both parties subsequently bring forth children with their different

mates. On the other hand we ought not to give an absolutely bad prognosis, except where the husband has no spermatozoa. It is not by any means rare for a woman to conceive after years of sterility, even where everything had apparently been done for relief without result, and where all hope (as well as all treatment) had been abandoned for years. Nor is it rare to find a very small uterus, that on examination seems positively too small for maternity, develop for some reason or other without any treatment whatsoever, and the patient conceive afterward.

CHAPTER XV

Examinations and Experiments—Preliminary Observations.

The following pages contain an abbreviated history of my examinations and experiments in cases from which the deductions and facts given in the preceding pages have been drawn. Only the essential points in the histories have been put down. In cases where the condom specimen showed no spermatozoa or none were found in the genitals of the female, either another condom specimen was requested or the husband was asked to come for examination; but in many cases I obtained neither another specimen, nor saw the husband, and so some of the histories only show one examination.

I have followed the method of most German investigators of numbering not by cases but by examinations. The experiments are not put down separately, but will be found in the text of the histories. Some are especially marked as experiments. The date of consultation is sometimes noted in parentheses.

As will be seen from these histories I have thus

far made 475 examinations. This does *not* include all the sterility cases I have examined, but only those in which I was able to obtain at least one condom specimen or able to make at least one search for spermatozoa in the genitals of the female. Many cases came on their first visit at too long a period after coitus to examine their genitals for spermatozoa, and were requested to come again or to bring a condom specimen, but did neither. Such cases, of course, could not be included in my histories, as no deductions could be drawn from them.

These 475 examinations consisted of the examinations of 205 condom specimens, 216 examinations of various portions of the female genitals for spermatozoa, 28 aspirations of the testicles, and the examination of the fluid so obtained for spermatozoa in cases where the male was at fault, and 26 aspirations of testicles in non-sterility cases in order to see how often spermatozoa are found in the testicular fluid in non-sterility cases, as no such data could be found by me in medical literature. A table showing the number of times spermatozoa (living, dead and absent) were found in the different parts of the female genitals at various times after coitus will be found on pages 239 and 240. Almost all my cases of sterility were primary sterility, but in a few instances, especially where something of particular interest presented itself, a case of secondary sterility was also recorded.

In my earlier cases, following the ordinary custom, I went by the condom method, and always ex-

amined a condom specimen first, but later on I searched first for spermatozoa in the genitals, and only where they were absent did I request a condom specimen to see whether any spermatozoa were present in the semen as it left the penis.

In the histories which I give at first I have also inserted the explanations and deductions to be drawn therefrom, but later on, where identical cases are recorded, the deductions are not repeated, as the reader will be able to make his own deductions. Of course, any new item is explained, as in the case of the first histories.

The histories here recorded are simply abbreviated from my case records. The examinations were made and put down in my case records as they occurred, and while gathering my material I had no theory either to prove or disprove. The cases are not here recorded in the order of their first visits, but as a general thing in alphabetical order, except as to the first few histories, which have been picked out in order either to illustrate the method of procedure or some unusually interesting features. Some are merely inserted for statistical purposes.

Most of my cases were dispensary cases, and the fact that many were lost sight of after a time does not imply that they did not become gravid. Time after time have I accidentally run across or heard of one of these patients who did not respond to my various letters, and found that she had given birth to a child, but was either too illiterate to

write or did not think it necessary to call or answer as long as she had no further use for me. Those that did remain sterile called or replied to my letters more often.

Brickner,[7] in his review of his operation cases for sterility, reports a cure in 42% of his private patients and only 17% of his dispensary cases. About 40% of his ward patients did not reply to his letters, while he heard from all of his private patients. Most of the replies which he did receive from his ward patients were from patients who had not been relieved of their sterility. *Brickner* (in a private communication) agrees with me that it is this factor that dispensary patients do not reply when they are well, which makes up the great difference in his results of operations for sterility, between his ward and private cases, for he distinctly states that the cases in each class were selected with equal care.

The following examination numbers refer to cases of particular interest:

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 30, 31, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 60, 61, 63, 64, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 98, 99, 148, 149, 150, 151, 152, 155, 156, 164, 165, 166, 167, 168, 176, 264, 265, 266, 267, 272, 273, 274, 275, 276, 277, 278, 290, 299, 300, 301, 302, 303, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 416, 417, 418, 419, 420, 421, 422.

In considering these cases, the reader should also read the paragraphs preceding the examination numbers in order to get the history of the case to which they refer.

The following case of Mrs. S. S., briefly reported, illustrates the mode of procedure, and the length of time spermatozoa may be found in the genitals. The patient was under observation for over 4 years.

Mrs. S. S., age 32, married 12 years, sterile since marriage, but had a miscarriage brought on by a midwife when single. Periods normal. Both she and husband very passionate. Had curettage and dilatation by a prominent gynecologist 5 years previous. Everything normal except an acute anteflexion.

Examination 1. (December 21, 1907.)—Condom, 1 hour after coitus, and after 3 days' continence, shows many lively spermatozoa.

Examination 2.—4 days after coitus, no spermatozoa found in fundus of uterus.

Examination 3.—42 hours after coitus, no spermatozoa found either in cervix or in fundus.

Examination 4.—4 hours after coitus, a few dead spermatozoa found in vagina, but no live ones. The dead spermatozoa have straight tails, showing that they were alive when expelled. Many live spermatozoa found in cervix, but none in uterus.

Examination 5.—84 hours after coitus, no spermatozoa, either dead or alive, found either in vagina, cervix or fundus.

Examination 6.—123 hours after coitus, no spermatozoa found anywhere.

Examination 7.—4 hours after coitus, no spermatozoa in vagina, but live ones in cervix.

Examination 8.—90 hours after coitus, but after a phosphate of soda douche 2 hours before examination, no spermatozoa either in cervix or uterus.

Examination 9.—43 hours after coitus, many lively spermatozoa in cervix.

Examination 10.—116 hours after coitus, many live spermatozoa and also some dead ones found high up in cervix. This is the longest time after coitus that I have found live spermatozoa in the genitals.

Examination 11.—164 hours after coitus, no live spermatozoa, but a few *dead* ones found in the fundus uteri. This is the longest time after coitus that I have found *dead* spermatozoa in the genitals.

Examination 12.—105 hours after coitus, *and on first day of period*, dead spermatozoa, but no live ones found in cervix. Some of the spermatozoa had half of the tail off.

As already stated, the above examinations were made merely to ascertain how long after coitus I could find spermatozoa in the various portions of the genital tract. The conclusions to be drawn from such a case are, first, that the husband is normal; in the second place, that there was nothing wrong (in spite of the anteflexion) with the uterus (either cervix or fundus), but that there existed

some stenosis of the tubes, probably due to infection caused by the midwife in producing the abortion. In this case I advised an exploratory operation, which patient has been considering for some time, but has not as yet decided upon. I do not think the uterus at fault for the following reasons: in the first place, the uterus on palpation was not a small atrophic organ, and could retain live spermatozoa for a long time; and in the second place, the uterus had been previously curetted by a very able gynecologist, who, under anesthesia, could find nothing abnormal either in the uterus or the rest of the pelvis, and actually guaranteed the patient a child. I do not think the ovaries at fault, because in the first place the woman had conceived before marriage, in the second place, nothing abnormal could be felt in the pelvis even under anesthesia, and finally, the woman was very passionate sexually, had her periods absolutely regularly and without pains. I think the case an ideal one for a conservative exploratory operation.

The next case, that of Mr. and Mrs. J. F., illustrates two important points: first, the very common observation that a female will have one or more operations on her genitals, when the entire fault lies with the male; and, secondly, a very important point, it illustrates what can be accomplished by persistent treatment in some apparently hopeless cases in the male.

Mrs. J. F., age 34, married 12 years, and sterile. Periods normal and painless. Both she and

her husband are very passionate. Genitals normal, except for a conical cervix. Had a curettage in Vienna one year previously, and another curettage in a prominent hospital in New York six months previously.

Examination 13. (November, 1907.)—Condom, 10 hours after coitus and after 2 weeks' continence, shows an enormous number of *dead* spermatozoa, but no live ones.

Mr. F. was examined, and it was found that he had one atrophic testicle, an enlarged prostate, and a very sensitive posterior urethra. He denied any venereal disease, and there was no sign of any epididymitis. He was treated by massage of the prostate and deep urethral injections of weak silver nitrate solutions. After 6 weeks' treatment his prostate and deep urethra were very much better, and another examination was made as follows:

Examination 14.—After 8 days' continence a few *live* spermatozoa found in condom.

Treatment was continued, and 6 weeks later another examination was made as follows:

Examination 15.—After 10 days' continence, *many live* spermatozoa found in condom.

Treatment was continued, and after 4 months another examination was made, as follows:

Examination 16.—20 hours after coitus, a few dead spermatozoa found in the fundus uteri.

The patients then passed out of observation, but, from the progress that was taking place, I be-

lieve that had treatment been continued the quality of the spermatozoa would have so far increased that they would have been found alive in the female genitals.

The following case is one of many to be reported, and illustrates the deductions that can be drawn:

Mrs. C., married 4 years, and sterile. No other symptoms. Has an acute anteflexion.

Examination 17.—No spermatozoa found in vagina or uterus 3 hours after coitus.

Examination 18.—No spermatozoa found in vagina or uterus 4 hours after coitus.

Examination 19.—Menstruating. Live spermatozoa found on cervix.

Note.—For obvious reasons, it is not advisable to make examinations during the menstrual period, but at the time I was interested to ascertain whether spermatozoa could be found either alive or dead at the menses.

Examination 20.—3 hours after coitus some spermatozoa were found, some in the vagina, and some in the cervix, but all *dead.*

From these examinations we may conclude that the husband is all right, since live spermatozoa were found on the cervix, but that there was something in the secretions of the genitals which either killed them or dissolved them so that they could not be found.

In the following case, although live spermatozoa were found in the condom, we cannot abso-

lutely absolve the husband from blame. He always refused to present himself for examination, considering himself normal.

Mrs. B. F., married 2 years, and sterile. Periods before marriage came every 4 weeks, and now every 3 weeks. Only painful on first day. Has anteflexion, eroded cervix, and endocervicitis.

Examination 21.—Patient has had coitus 3 nights in succession, and condom shows only 2 *dead* spermatozoa.

Examination 22.—After 4 days' continence, condom shows *live* spermatozoa.

Examination 23.—No spermatozoa found in cervix 9 hours after coitus.

Examination 24.—Only a few dead spermatozoa found in vagina, and *none* at all in cervix.

Examination 25.—Exactly like Examination 24.

Examination 26.—No spermatozoa found in cervix or anywhere else in the genital tract 1 hour after coitus.

The patient, as already stated, had an intense endocervicitis, which resisted all treatment, and this may have dissolved the spermatozoa, or so altered them that they could not be recognized. As a general thing, however, catarrhal secretions have the effect of killing off the spermatozoa, so that we do find them, but they are dead. The fact that they were *never* found in the cervix, even as early as 1 hour after coitus, makes me strongly suspect that the husband was either suffering from a stricture or a hypospadias or epispadias.

The following is a very simple case and also a very common experience, in which the husband is normal, and the entire fault is to be found in the cervix. The husband is considered all right because the condom showed that he discharged normal spermatozoa, and the cervix showed that his spermatozoa reached the spot. The fact that the spermatozoa found on the cervix were dead simply implies that they were killed by the secretions of the cervix, since the condom showed that they were all right when they left the penis.

Mrs. S. G., age 29, married 7 years, and sterile. Periods normal. Uterus appears small to palpation, but on sounding is found large enough.

Examination 27.—Condom, 3 hours after coitus and after 4 days' continence, shows many lively spermatozoa.

Examination 28.—6 hours after coitus; many *dead* spermatozoa found entangled in thick plug of cervical mucus. None at all in interior of uterus.

Examination 29.—4 hours after coitus and after 3 days' continence shows no spermatozoa, dead or alive, either on cervix or in uterus.

The following is an experience I have had time and again, and it has convinced me that, contrary to the statement made by *Haussmann,* an alkaline douche *does* have the effect of preserving the life of spermatozoa and is often a powerful aid in the cure of sterility.

Mrs. F. H., age 27, married 10 years; ster-

ile. Periods every 4 weeks and very painful. Has an anteflexed uterus with a pinhole os.

Examination 30.—2½ hours after coitus shows many *dead* spermatozoa, but no live ones, either on the cervix or in the vagina.

Examination 31.—5 hours after coitus, and after having taken a phosphate of soda douche before coitus, shows *live* spermatozoa on cervix.

The following is another case showing the utility of the alkaline douche.

Mrs. S. K., age 25, married 3 years, and sterile. Patient has a very small uterus.

Examination 32. (December, 1906.)—Condom 2 hours after coitus shows many live spermatozoa.

Examination 33.—10 hours after coitus, a few *dead* spermatozoa found in cervix.

Examination 34.—4 hours after coitus, a few dead spermatozoa found in cervix and at fundus uteri.

Examination 35.—Used a phosphate of soda douche ½ hour before coitus. Many *live* spermatozoa found in mucus on cervix, and many dead spermatozoa at fundus uteri.

The following case illustrates some interesting points, which will be discussed after the history is briefly stated.

Mrs. B. K. consulted me in July, 1906. She had been married 3 years to her first husband and had 2 children. Her husband died, and after 8 years she married again; is now married 2 years

and sterile. Periods regular and painless. Has retroversion.

Examination 36.—2 hours after coitus, many dead spermatozoa found in vagina, but no living ones, also dead spermatozoa in cervix.

Examination 37.—7 hours after coitus, and after a phosphate of soda douche before the coitus, live spermatozoa found in interior of cervix.

Examination 38.—7 hours after coitus, dead spermatozoa on exterior of cervix, live spermatozoa within cervix, and live spermatozoa in fundus uteri.

In the first place, we notice again the utility of the alkaline douche before coitus. In the next place, we know that the husband is normal. We also know that, in spite of the retroversion, live spermatozoa *do* reach the fundus uteri, so that cannot account for the sterility. The patient has not an atrophic uterus; moreover, her menstrual history is normal, and she had 2 children in 3 years by her first husband, showing that her ovaries are probably all right. There can only be two theories to explain the sterility: either there was caused by the last labor or in the puerperium a stenosis of both tubes, or this is one of those cases in which a normal woman is able to have children with one man and be sterile with another. In this case it would be folly to perform a curettage or an operation for the retroversion with the hope of relieving her sterility. I would advise waiting another year, using the alkaline douche before each

coitus, and then (after 3 years of married life) if she is not in the family way, to do an exploratory operation to investigate the condition of the tubes.

The following case illustrates, in the first place, the almost obvious necessity of examining the husband even if the wife has a pathological condition, and in the second place, the uselessness in such a case of performing any operation upon the genitals of the man, as well as the necessity of thoroughly investigating the condition of the testicles before advising an operation.

Mr. and Mrs. A. C., married 14 years, and sterile. Wife, age 33, has an acute anteflexion.

Examination 39.—Condom 3 hours after coitus, and after 5 days' continence, shows no spermatozoa at all.

The husband was then interviewed, and gave a history of gonorrhea 6 years before marriage. Has a greatly enlarged prostate.

Examination 40.—Aspirated left testicle and removed a large amount of clear serum, in which there were *no* spermatozoa.

Inasmuch as there existed no signs of epididymitis, and no history of any, I considered it advisable to treat his prostatic urethra, which I did by massage of the prostate and deep urethral injections of silver nitrate solutions.

Examination 41.—After 6 weeks' treatment. Semen (from coitus), no spermatozoa.

Examination 42.—4 hours after coitus and 4

days' continence, mucus from cervix, no spermatozoa.

Examination 43.—After 2 weeks' more treatment. Condom, after 3 weeks' continence, no spermatozoa.

Examination 44.—On same day as above. Aspirated right testicle, and obtained a large amount of clear fluid, but no spermatozoa.

Examination 45.—Aspirated left testicle, and again obtained a large quantity of cystlike fluid, but no spermatozoa.

This case is similar to the previous one, but did not submit to treatment.

Mr. and Mrs. S. K., married 3 years, and sterile. Wife is normal, except for a small os. Periods normal and painless. Both husband and wife very passionate; coitus almost every night.

Examination 46. (December, 1908.)—2 hours after coitus, no spermatozoa found in cervix or vagina.

Examination 47.—2 hours after coitus and 4 days' continence, semen shows no spermatozoa.

Husband was interviewed and denied venereal history. Had a right inguinal adenitis incised 3 years previously, but no pus was found. No signs of epididymitis.

Examination 48.—Aspirated right testicle, but no spermatozoa were found.

In the following case the testicle was aspirated to note the condition in tuberculosis of the testicle and epididymis. It was not a sterility case.

Examination 49.—Mr. J. L., tubercular orchitis and epididymitis. Aspiration shows one or two dead spermatozoa, but no live ones.

The following history is very significant.

Mr. G., age 42, no venereal history. He was married in 1882, and four months later came to America. His wife followed in 1½ years. A child was born 8½ months after her arrival. The child was very large, and had to be taken with instruments. Has been sterile since (about 7 years). No signs of epididymitis or any other trouble with husband.

Examination 50. (1901.)—Condom shows no spermatozoa.

Examination 51.—Condom shows no spermatozoa.

The probabilities are that the husband was always sterile, and was not responsible for the child born 8½ months after wife's arrival.

Mr. W., was married several years, and his wife never became pregnant.

Examinations 52 and 53.—On two occasions no spermatozoa were found in condom.

Wife had curettage, with no benefit. He obtained a divorce from her and married again, but wife No. 2 also failed to become pregnant. Wife No. 1 married and became pregnant.

Mrs. L. A., married several years, and sterile. Has an acute anteflexion. Only made one visit.

Examination 54.—Condom shows live spermatozoa.

Mrs. G. B., married 3 years, and sterile. Husband is very passionate, but she is more so. Between periods they have coitus two or three times every night.

Examination 55.—3 hours after coitus. Condom shows many lively spermatozoa. The spermatozoa are very minute, almost all head. From many observations I am inclined to consider the diminutive tails as due to too frequent connections.

Mrs. B. B., married 3 years, and sterile. Has a small anteflexed uterus. Was curetted, with no result.

Examination 56.—5 hours after coitus. Condom shows many lively spermatozoa with very long tails. Patient only made one visit. In all probability the fault was in the not sufficiently developed uterus, but inasmuch as I did not have the opportunity for more careful observation as to the presence or absence of spermatozoa in the genitals, I cannot be certain.

Mrs. Bessie B., married 3 years, and sterile. Husband is very passionate, and so is she.

Examination 57.—2 hours after coitus. Condom shows many active spermatozoa, with small heads and *tiny* tails.

Patient has a markedly anteflexed uterus, with stenosis of os and a long conical cervix. Was referred to hospital, but never went.

Mrs. R. B., married 4 years, and sterile. Only came once.

Examination 58.—Condom shows no spermatozoa.

Mrs. S. B., married 2 years, and sterile.

Examination 59.—2 hours after coitus. Condom shows many live spermatozoa. Patient has a small anteflexed uterus. Suffers from severe dyspareunia, due to vaginismus, so that husband can hardly enter. The vaginismus was so marked that no speculum or dilator could be introduced to ascertain if spermatozoa reached the cervix. This probably had much to do with her sterility. Patient never came back after the first attempt at examination.

Mr. and Mrs. B. In this case the husband was obviously at fault, and an attempt was made to overcome the stenosis caused by an epididymitis by treating the prostatic urethra. This was one of my earlier cases (1905), and my first experiment with this method of treatment. In a few cases I have been successful. The wife was suffering from a marked retroversion.

Examination 60.—Condom shows no spermatozoa.

The husband was then interviewed, and gave a history of gonorrhea, lasting 4 months, 10 years ago. He has an old double chronic epididymitis, with an enlarged prostate and a slight stricture in the anterior urethra. Must get up several times at night to urinate. Patient was treated by massage of the prostate and deep urethral in-

jections of silver nitrate solutions. But after 6 months of treatment we find:

Examination 61.—Condom shows no spermatozoa.

The following case presents nothing interesting, and is introduced merely for statistics.

Mrs. B. B., married 5 years, and sterile. Has a small anteflexed uterus.

Examination 62.—2 hours after coitus, and after having had coitus only a few hours before, shows many lively spermatozoa in condom.

Mrs. M. B., married 11 years, and sterile.

Examination 63.—4 hours after coitus. No spermatozoa at all found either in vagina, cervix, or interior of uterus. The os was wide open, and it was easy to get high up in the uterus.

So far all that could be said was that either the husband had no spermatozoa at all, or if he did, he did not propel them into the wife's genitals. To settle the question, a condom specimen was requested and brought.

Examination 64.—Condom shows no spermatozoa at all, showing the husband was the guilty party.

Mrs. M. Bl., married 1½ years, and sterile.

Examination 65.—4 hours after coitus and 6 days' continence. Condom shows many spermatozoa, but all dead. Another specimen was requested, but not brought.

The following case is very interesting, and

illustrates the effect of catarrhal inflammation upon the viability of spermatozoa.

Mrs. A. D., age 22, married only 8 months, and seeks treatment for sterility. Both she and her husband are fairly passionate. Has an acute anteflexion, but a wide-open cervical os.

Examination 66.—1½ hours after coitus shows many lively spermatozoa in mucus of cervix.

Examination 67.—11 hours after coitus, only a few dead spermatozoa found in cervical mucus. Mucus of cervix markedly acid. Ordered a phosphate of soda douche before coitus.

Examination 68.—18 hours after coitus, and after a phosphate of soda douche, shows no spermatozoa in cervix. Mucus alkaline.

Examination 69.—18 hours after coitus, dead spermatozoa found in cervix.

Examination 70.—18 hours after coitus, only a few dead spermatozoa found in cervical mucus. Reaction of mucus is neutral.

What are we to conclude from these four examinations? In the first place, we know that the husband is normal. Then that there is something in the uterine secretion which kills the spermatozoa. We notice that if the examination is made very early (1½ hours after coitus) live spermatozoa are still found on the cervical mucus, but if made later, either no spermatozoa or only dead ones are found. At first I thought that it was the acid secretion that killed the spermatozoa, so I ordered an alkaline douche, which had the effect of

rendering the cervical reaction alkaline, but still the spermatozoa were killed.

Patient then went to Cincinnati and had a curettage performed, and was seen by me three months later.

Examination 71.—3 hours after coitus. Vaginal mucus acid, except where there is a large pool of semen, this pool being alkaline. In this pool are many large spermatozoa with straight tails, but all dead. Cervical mucus alkaline, and contains many live spermatozoa.

Examination 72.—*75 hours* after coitus (the same coitus as previous examination). Many lively spermatozoa found in cervical mucus and high up in cervix. Cervical mucus alkaline. These last two times no alkaline douche was taken, and still cervical mucus was alkaline.

We thus see the result of the curettage. We saw that before the curettage there was something about the uterine mucosa which not only killed the spermatozoa but also rendered its secretion acid. We saw that it was not alone the acidity that killed the spermatozoa, for they were still killed even if the reaction of the mucus was artificially made alkaline. After the curettage not only did the cervical mucus remain alkaline without artificial help but also live spermatozoa were found in cervical mucus and within cervix 75 hours after coitus.

There is still another interesting feature about this case. The patient had an eroded cervix, which I treated by touching up with a strong sil-

ver nitrate solution. As a result, the entire cervix was for a time inflamed, both inside and outside. I was interested to know what effect this inflammation would have on the spermatozoa, and made the following examination.

Examination 73.—7 hours after coitus. No spermatozoa found, either on cervical mucus or within cervix.

Mrs. A. G., age 30, married 8 years, and sterile. Periods every 3 weeks and very painful. Has a small uterus. Was operated on by a prominent gynecologist 5 years previously for sterility. Both she and her husband are fairly passionate.

Examination 74.—3 hours after coitus and 4 days' continence. Condom shows many very large and very lively spermatozoa.

Examination 75.—60 hours after coitus. No spermatozoa found in vaginal mucus.

Examination 76.—20 hours after coitus, and after phosphate of soda douche before coitus. No spermatozoa found in vagina, cervical mucus, or interior of cervix.

Examination 77.—6 days after coitus, and 2 days after period. No spermatozoa found in uterus. This examination was done merely to see how long after coitus I could find live spermatozoa in genitals.

Examination 78.—17 hours after coitus (19 hours after phosphate of soda douche). Mucus in posterior vaginal vault is alkaline, but no sperma-

tozoa in it. A few dead spermatozoa in cervical mucus.

Examination 79.—65 hours after coitus. No spermatozoa at all found in cervical mucus.

Examination 80.—42 hours after coitus, and during period. No spermatozoa anywhere. (See Note to Examination 19.)

Examination 81.—2 hours after coitus. Many lively spermatozoa in interior of cervix.

From these examinations we can conclude that the husband is normal, but that there was something about the uterine discharge which killed and dissolved the spermatozoa. If examined a short time after coitus (2 hours) they were still found alive, but on all later examinations they were never found. The uterus was very small, but even if too small to support a growing fetus, there is no reason why the spermatozoa should have been killed. I have made many examinations in absolutely infantile uteri and always found live spermatozoa in various parts of the genital tract, even within the small uterus, unless there was also an endometritis or other condition inimical to spermatozoa.

In this case I advised and performed a curettage. My reasons for this procedure were based entirely upon the examinations. In spite of the fact that the uterus was small, it was not so small that it could not be developed, and as a matter of fact I have seen some very small uteri in recently married women who later gave birth to children. But the main point was, that it was not the small-

ness of the uterus that was responsible for the sterility, but the condition of the endometrium, which was amenable to treatment. The patient passed out of observation shortly after the operation, so that I have no way of knowing whether she became gravid. I have written to her latest address, but my letter was returned "not found."

Mrs. S. B., age 31, married 10 years, and sterile. Periods every 4 weeks and painless. Both she and her husband are very passionate, having coitus every night and sometimes twice a night. Patient has an acute anteflexion.

Examination 82.—3 hours after coitus, and the second coitus that night, shows many spermatozoa, almost all dead, but some are alive.

In the following case the female is undoubtedly at fault.

Mrs. B. B., age 23 (1907), small, thin, and very anemic. Married 5 years, and sterile. Periods come at intervals of between 1 and 5 months. Some pain. Has exophthalmus, but no goitre and no tremor of hands. Pulse, 90. Husband is very passionate, but she not at all. Has a small uterus, anteflexed.

Examination 83.—2½ hours after coitus, and 4 days' continence, shows: A few large dead spermatozoa on clitoris; an enormous number of dead spermatozoa in vagina; many dead spermatozoa on cervix, but also a few live ones; many live spermatozoa at the fundus uteri.

Mrs. F. B., age 24 (1908), married 5 years, and

sterile. Periods every 4 weeks and somewhat painful. Both are fairly passionate.

Examination 84.—2 hours after coitus and 3 weeks' continence. Condom shows many lively spermatozoa.

In the following case, from the two examinations that I could make, the husband in all probability was at fault. More examinations, however, are necessary.

Mrs. M. B., age 26 (1908), married 6 years, and sterile. Periods every 4 weeks and no pain. Husband is not very passionate, but she is more so. Has an acute anteflexion.

Examination 85.—5 hours after coitus and 5 days' continence. Condom shows no spermatozoa.

Examination 86.—3 hours after coitus and after 8 days' continence. Condom shows a few dead spermatozoa, but no live ones.

Mrs. S. B., age 22 (1907), married 3 years, and sterile. Periods every 4 weeks and no pain. Husband is quite passionate, but she is not. Has an acute anteflexion.

Examination 87.—4 hours after coitus and 10 days' continence. Condom shows no spermatozoa. (See later history, Examination 287, etc.)

The following case illustrates that we cannot give a positively bad prognosis from the size of the uterus. The diagnosis of infantile uterus was made by a very competent gynecologist, and was concurred in by at least three other physicians, including the writer. As a matter of fact, it was a

very easy case for diagnosis. In spite of all this, the patient became pregnant, and gave birth to a healthy child after having been sterile for seven years. It is also of interest to note that the patient was subjected to no treatment at all.

Mrs. B. B., age 29 (1908), married 6½ years, and sterile. Periods every 3 weeks and very painful. Husband, age 37. Husband is very passionate, but she is even more so. Has an infantile uterus.

Examination 88.—2 hours after coitus and after 2 days' continence. Condom shows many spermatozoa, mostly dead, but a few live ones. About 10 months after this examination patient gave birth to a healthy child.

Mrs. A. B., age 26 (1908), married 3 years, and sterile. Patient is small and stout. Periods every 4 weeks and no pain. Had dilatation and curettage 13 months previously, but still has a marked anteflexion. Husband is very passionate, having coitus 4 or 5 times a week and sometimes twice a night, but she is not at all passionate.

Examination 89.—2 hours after coitus and after 4 days' continence. Condom shows many normal spermatozoa.

The following case is one of many, and the point will probably have been noticed in reading the histories of many of the previous cases, to wit, that when coitus is frequently repeated at short intervals, the spermatozoa found in the condom, al-

though they may be numerous, are either dead or very feeble.

Mrs. C. B., age 27 (1908), married 3 years, and sterile. Periods every 3½ weeks and very painful. Both husband and wife are very passionate, having coitus almost every night and sometimes twice a night. Has an acute anteflexion.

Examination 90.—2 hours after coitus and 3 weeks' continence. Condom shows many spermatozoa, but all dead.

Examination 91.—2½ hours after coitus and 3 days' continence. Condom shows many spermatozoa, almost all dead, and only one or two feebly moving.

The following case illustrates the same point.

Mrs. S. C., age 30 (1907), married 4 years, and sterile. Periods every 4 weeks and very painful. Has a retroverted uterus and conical cervix. Husband is very passionate, having coitus every night, but she is not at all.

Examination 92.—5 hours after coitus and 14 days' continence. Condom shows an enormous number of spermatozoa, but almost all dead. A few feebly active ones are seen.

Mrs. E. C., age 27 (1907), married 10 years, and sterile. Has a very small uterus and a left salpingo-oophoritis.

Examination 93.—3½ hours after coitus and 2 days' continence. Condom shows many normal active spermatozoa.

In the following case more examinations are necessary in order either to put the blame on the husband or cast suspicion on the wife.

Mrs. C. F., married 3 years. Had a 4-months' miscarriage 2½ years ago, and has been sterile since. Always lived with husband. Periods every 4 or 5 weeks and not very painful. Both she and her husband are fairly passionate.

Examination 94.—3 hours after coitus and 4 days' continence. Condom shows *no* spermatozoa.

Mrs. E. C., age 26 (1907), married 4½ years, and sterile. Has anteflexion and stenosis. Periods regular and painful. Husband is quite passionate, but she not at all.

Examination 95.—1 hour after coitus. Condom shows many lively spermatozoa, which are very tiny, with very long tails.

Patient had a dilatation and curettage at the hospital 2 months later, and 6 months after the operation became pregnant.

Mrs. E. C., age 32 (1908), married 6 years; sterile. Periods every 3½ or 4½ weeks and painful. Husband is fairly passionate, but she not at all. Has a conical cervix.

Examination 96.—2 hours after coitus and 2 weeks' continence. Condom shows a large number of lively normal spermatozoa.

Mrs. R. C., age 21 (1908), married 4 years, and sterile. Periods every 4 weeks and painless. Mother had 12 children. Has 3 married sisters, who have children. Husband's mother had 10

children. Both she and her husband are fairly passionate. Has an acute anteflexion.

Examination 97.—3 hours after coitus and 3 days' continence. Condom shows a small number of spermatozoa, most of which are dead, but still a sufficient number of active ones are present.

The following case shows that we ought to investigate the condition of the husband, no matter what the history is. The condition found was later easily guessed at from the subsequent information.

Mrs. A. C., age 29 (1908), married 11 years. Had a child 10 years ago, and has been sterile since. Periods regular. Husband is very passionate, having coitus 4 or 5 times a week, but she is not at all. From the above history one might not think it necessary to investigate the husband.

Examination 98.—2 hours after coitus and 1 week's continence. Condom shows *no* spermatozoa.

Examination 99.—One week later. 2 hours after coitus and 1 week's continence. Condom shows *no* spermatozoa.

Further inquiry brought out the significant fact that after the birth of the child the husband left his wife in Europe and came to America, where he remained without her for two years. He has always refused to come for examination.

Mrs. R. C., age 21 (1908), married 4 years, and sterile. Periods normal. Has an acute anteflexion. Both are normally passionate.

Examination 100.—3½ hours after coitus and 2 weeks' continence. Condom shows a fair number of spermatozoa, but all *dead*. Semen only weakly alkaline.

Mrs. F. C., age 28 (1907), married 7 years, and sterile. Period every 4 or 5 weeks and very painful. Neither she nor her husband are very passionate.

Examination 101.—2 hours after coitus and only 1 day's continence. Condom shows no spermatozoa.

The following is another very common example, where the wife is operated on for an anteflexion, without the husband having been investigated, and where, in fact, he is the guilty party.

Mrs. A. C., married 4 years (1907), and sterile. Periods regular, with slight pain. Husband is quite passionate, but she not at all. Had dilatation one year previously, but still has an acute anteflexion.

Examination 102.—3 hours after coitus. Condom shows *no* spermatozoa.

Examination 103.—Four days later. Condom shows *no* spermatozoa.

Mrs. C. D., married 5 years (1906), and sterile. Periods irregular, lasting 5 or 6 days, and coming on at intervals of 4, 5, or 6 weeks. Patient has no sexual desire, and experiences no orgasm. Has a medium-sized anteflexed uterus. Uterine canal normal.

Examination 104.—1½ hours after coitus. Condom shows numerous live spermatozoa.

Examination 105.—4 hours after coitus. Dead spermatozoa found in cervix and vagina.

We can therefore conclude that the husband is normal, since his spermatozoa reached the cervix, and on the condom examination on a previous occasion were found normal. In all probability the uterine secretion was inimical to the life of the spermatozoa.

Mrs. S. D., age 24 (1908), married 4 years, and sterile. Periods every 3 or 4 weeks and very painful. Mother had 9 children. Has 4 sisters, all married, and all have children. Husband, age 26, his mother had 16 children. He is very passionate, having connection 4 or 5 times a week and sometimes twice a night. She is also quite passionate. Patient has a prolapsed left ovary and a small uterus.

Examination 106.—1 hour after coitus and after 4 days' continence. Condom shows lively spermatozoa of average size and quantity.

In the following case the husband was undoubtedly at fault.

Mrs. C. D., age 30 (1908), married 10 years, and sterile. Periods normal. Husband is very passionate, but she is not. Patient has a small anteflexed uterus.

Examination 107.—4½ hours after coitus and after 2 weeks' continence. Condom shows thin, scant, watery semen and no spermatozoa.

Examination 108.—3½ hours after coitus and 1 week's continence. Condom shows no spermatozoa.

Examination 109.—4 hours after coitus and 1 week's continence. Condom shows no spermatozoa.

Mrs. I. E., married 2 years(1907), and sterile. Periods every 4, 5, or 6 weeks, and very profuse. Patient has a normal-sized uterus, but acutely anteflexed. Was sent to the hospital for operation, but never went.

Examination 110.—2 hours after coitus and 4 days' continence. Condom shows many live spermatozoa.

Mrs. A. E., married 3½ years (1906), and sterile. Periods normal. Has dyspareunia since several weeks. Has a retroflexed uterus. Husband's intercourse is very rapid, and patient is inclined to blame the husband for the sterility. He has a very enlarged prostate.

Examination 111.—Live spermatozoa found in semen.

Examination 112.—4 hours after coitus. Live spermatozoa found in uterus. This shows that in spite of the premature ejaculation the husband was not at fault.

Mrs. L. E., age 24 (1907), married 6 years, and sterile. Periods every month, lasting 1 day, and very painful. Patient not passionate, but husband is. Her mother had 10 children. Husband's mother had 19 children. Patient has a small an-

teflexed uterus. I would like to repeat that this combination of a small uterus, lack of sexual passion, and very scant menses, is very frequent in sterility cases, and I believe it indicates lack of development in the ovaries as well as in the uterus.

Examination 113.—1½ hours after coitus (condom was not kept warm, although it was winter). Condom shows many live and active spermatozoa.

Mrs. F. (No history was taken at first visit, but only condom examined, and patient was told to come later, when I expected to record complete history, but she never came.)

Examination 114.—3 hours after coitus. Condom shows many spermatozoa, but all dead. Case is inserted merely for statistical purposes.

Mrs. D. F., age 30 (1909), married 8 years, and sterile. Periods every 3½ weeks and very painful. Four years ago had *Dudley's* operation performed on her cervix by a prominent gynecologist. Husband had children by his first wife, last child 10 years ago. Husband is very passionate, but she not at all. Has an acute anteflexion.

Examination 115.—54 hours after coitus shows: A few dead and one live spermatozoa found in cervical mucus; many live spermatozoa found about one inch up in interior of cervix, after swabbing away the cervical mucus.

The following case is one of many in which the wife is obviously at fault. Similar cases have been already discussed above, so no comment will be made.

Mrs. L. F., age 22 (1908), married 3 years, and sterile. Periods every 4 weeks, with severe pain. Mother had 12 children and husband's mother had 8. Husband is very passionate, but she not at all. She has a small anteflexed uterus.

Examination 116.—6 hours after coitus. Only a few dead spermatozoa in genitals.

Examination 117.—2 hours after coitus and 11 days' continence. Condom shows numerous lively spermatozoa.

Mrs. G. F., age 35 (1908), married 12 years, and sterile. She is tall and stout. Periods normal. Had curettage 9 years previously, but still has an acute anteflexion. Her mother had 11 children, and her husband's mother had 10. Husband is fairly passionate, but has often premature ejaculation. She is not at all passionate.

Examination 118.—2 hours after coitus and 3 weeks' continence. Condom shows very many lively spermatozoa.

Mrs. A. F., married only 11 months (1906), and comes complaining of sterility. Periods normal. Has been masturbating since childhood, and does so still. Has an acute anteflexion.

Examination 119.—1 hour after coitus shows live spermatozoa on cervix.

Mrs. M. F., age 23 (1907), married 3 years, and sterile. Periods every 4 weeks and slightly painful. Patient is small and undersized. Mother had 9 children. Husband's mother had 15 children. Neither parties are very passionate.

Examination 120.—2 hours after coitus and 2 days continence. Condom shows no spermatozoa.

Mrs. I. G., married 4 years (1907), and sterile. Periods every 3 or 3½ weeks, lasting 7 or 8 days, and very painful. Has a small anteflexed uterus.

Examination 121.—2½ hours after coitus. Condom shows many small spermatozoa, almost all dead, but a few live ones.

Mrs. A. G., age 26 (1907), married 5 years, and sterile. Periods every 5 or 6 weeks, and not painful. Husband is fairly passionate, but she is not. Has a small anteflexed uterus. This is another case of small uterus, lack of sexual passion, and periods at long intervals.

Examination 122.—15 hours after coitus and after 4 days' continence. Condom shows active live spermatozoa.

Mrs. F. G., age 27 (1907), married 3 years, and sterile. Periods irregular, sometimes every 3 weeks, and other times every 7 or 8 weeks, and always painful. Mother had 12 children, and husband's mother had 8 children. Husband is very passionate, but she is not at all. Has an acute anteflexion.

Examination 123.—3 hours after coitus and 1 day continence. Condom shows very many spermatozoa, but all dead.

Mrs. P. G., tall and stout, age 26 (1909), married 6 years, and sterile. Periods every 4 weeks, lasting only 1 day, and no pain. Mother had 9 children, and husband's mother had 5 children.

Husband is fairly passionate, but she not at all. Has a small uterus. This is another case of small uterus, lack of sexual passion, scant periods, and sterility.

Examination 124.—6½ hours after coitus shows many live spermatozoa in interior of cervix.

Mrs. H. G., age 21 (1907), married 3 years, and sterile. Periods every 4 weeks, lasting 6 days, and very painful. Her mother had 12 children, and husband's mother had 7. Has an acute anteflexion, and also suffers from dyspareunia.

Examination 125.—2 hours after coitus shows some spermatozoa in vagina, but all dead, and none in cervix.

Examination 126.—2½ hours after coitus. Condom shows many large, lively spermatozoa.

Mrs. L. G., age 24 (1908), married 7 years, and sterile. Periods every 4 weeks and some pain. Her mother had 15 children, and her husband's mother had 9. Husband is very passionate, and she is fairly so. Has a very small uterus, acutely anteflexed.

Examination 127.—Condom, which had been standing in a cold room all day before I saw it, shows many spermatozoa, all dead, but which were probably alive when ejaculated.

Mrs. S. G., age 28 (1907), married 7 years, and sterile. Periods every 3 weeks and very painful. Her mother had 13 children, and husband's mother had 10. Husband is very passionate, having connection 5 times a week, and she is fairly so.

Examination 128.—17 hours after coitus and 2 days' continence. Condom shows many spermatozoa, but all dead.

Examination 129.—4 hours after coitus and 3 days' continence. Condom shows only dead spermatozoa.

Mrs. S. G., age 29 (1908), married 6 years, and sterile. Periods every 3½ weeks and very painful. Mother had 12 children and husband's mother had 4. Husband is very passionate, and she fairly so. Has an acute anteflexion.

Examination 130.—1 hour after coitus and 2 weeks' continence. Condom shows no spermatozoa.

Examination 131.—2½ hours after coitus and 3 days' continence. Condom shows no spermatozoa.

Mrs. I. G., age 21 (1907), married 2 years, and sterile. Periods every 4 or 5 weeks, lasting 4 or 5 days, and no pain. Mother had 8 or 9 children and husband's mother had more than 4 children. She has a very small and undeveloped uterus, anteflexed and retroverted. Both she and her husband are about normally passionate.

Examination 132.—2 hours after coitus. Condom shows many small and lively spermatozoa.

The following is another case showing the combination of sterility, lack of or depraved sexual desire, small uterus, and periods at long intervals.

Mrs. R. G., married 4 years (1906), and sterile. Periods every 6 or 7 weeks, or even 3 months. Has no sexual feeling, except when husband has connection backward, she lying on her side. She has

an anteflexed small uterus and a double salpingo-oophoritis.

Examination 133.—Condom shows many live spermatozoa.

Examination 134.—3 hours after coitus, shows no spermatozoa in genital tract.

Examination 135.—12 hours after coitus. Many live spermatozoa found in cervix.

Mrs. B. G., age 22 (1907), married only 1½ years, and comes complaining of sterility. Periods normal. Husband is very passionate, having coitus 4 or 5 times a week, but she is not at all.

Examination 136.—3 hours after coitus and 2 days' continence. Condom shows no spermatozoa.

Examination 137.—After 5 days' continence, condom shows no spermatozoa.

I examined the husband, and found that he had an old double epididymitis.

Mrs. S. G., age 28 (1909), married 8 years, and sterile. Periods normal. Mother had 8 children, all of whom are married and all have children. Husband's mother had 12 children, and here again all are married and all have children. Husband is quite passionate, but she very little. She has an infantile uterus.

Examination 138.—2 hours after coitus and 2 weeks' continence. Condom shows no spermatozoa. Semen is only weakly alkaline.

Examination 139.—Condom, after 4 days' continence, shows no spermatozoa.

Mrs. S. G., married only 1½ years (1906),

comes for sterility. Periods every 4 weeks and very painful. Has an acute anteflexion and prolapse of both ovaries.

Examination 140.—3 hours after coitus. Live spermatozoa found on cervix.

Mrs. A. G., age 30 (1907), married 6 years, and sterile. Periods every 4½ and 5 weeks and very painful. Mother had 6 children. Husband had a child with first wife. Husband is fairly passionate, but she not at all. Patient has a large anteflexed uterus and chronic endometritis.

Examination 141.—4 hours after coitus and 4 days' continence. Condom shows many large live spermatozoa. In view of the previous history of the husband, it was not deemed necessary to make any further examinations to prove that he was not at fault.

Mrs. L. G., age 21 (1907), married only 1 year, and comes for sterility. Periods normal. Mother had 10 children. Husband's mother had 9 children. Both are fairly passionate.

Examination 142.—4 hours after coitus. Condom (which was brought cold) shows many dead spermatozoa, but no live ones. Another specimen was requested.

Examination 143.—1½ hours after coitus. Condom shows only 1 live spermatozoon, and all the rest are dead.

Mrs. M. H., age 35 (1909), married 12 years, and comes for sterility. Periods normal. Husband

is very passionate, but she is even more so. She has an acute anteflexion.

Examination 144.—5½ hours after coitus and after 4 days' continence. Condom shows many live spermatozoa.

Examination 145.—8 hours after coitus. Many lively spermatozoa found in interior of cervix.

Upon the strength of the above examinations, I advised operation, which patient has only recently had (as she informed me by letter in answer to my general note of inquiry); the time is as yet too short to notice any result.

Mrs. Y. H., age 23 (1907), married 2 years, and sterile. Periods every 2½ or 3½ weeks and very painful. Mother had 7 children. Husband's mother had 2 children. Husband is very passionate, having coitus every night, but she is not at all passionate. She has a small, acutely anteflexed uterus.

Examination 146.—4 hours after coitus and only 1 day's continence. Condom shows very many spermatozoa, alive, but somewhat feeble, probably due to too frequent coitus.

Mrs. F. H., married 2½ years (1906), and sterile. Periods every 3½ weeks and no pain. Sexual desire normal. Has an anteflexed uterus.

Examination 147.—2 hours after coitus. Condom shows many live spermatozoa.

CHAPTER XVI

Examinations and Experiments (*Continued*).

Mrs. C. H., married 6 years (1906), and sterile. Husband had many children by his first wife. He is probably syphilitic, and also had an acute epididymitis, but had children after that. Wife has a slight anteflexion.

Examination 148.—Condom shows only 2 dead spermatozoa.

Examination 149.—Condom shows no spermatozoa.

Examination 150.—Condom shows no spermatozoa.

Examination 151.—Condom shows no spermatozoa.

Examination 152.—Condom shows no spermatozoa after 5 days' continence. This shows very well how we must investigate in spite of previous history. How foolish it would have been to subject the wife to an operation for her slight anteflexion!

Mrs. M. H., age 28 (1909), married 10 years, and comes for sterility. Periods every 2 to 3 months and very painful. Mother had 11 children. Has only one married sister, who is married 2

years, and has no children as yet. Husband, age 26, and very stout. His mother had 6 children. Has no married brothers or sisters. Both husband and wife are fairly passionate. She has a rather small uterus, acutely anteflexed.

Examination 153.—2 hours after coitus and after 5 days' continence. Condom shows many very lively small spermatozoa.

Mrs. F. H., age 26 (1909), married 9 years. Had one 7-months' miscarriage with first husband 8 years ago and has been sterile since. Periods every 3½ weeks and painful, lasting 6 days and over. Mother had 11 children. Husband's mother had 5 children. Both husband and wife are normally passionate. She has an endometritis.

Examination 154.—5½ hours after coitus and 1 day's continence. A few live spermatozoa in cervix.

Mrs. A. J. (1906), was married 5 years to first husband, and had 1 child 10 years ago and 1 miscarriage 8 years ago. Has been married to present husband 7 years and has had no children or miscarriages, except a possible one 6½ years ago, when she had amenorrhea for 11 weeks, followed by 2 months' bleeding and some clots. Periods every 3 weeks, with severe pain. Has a chronic endometritis, and a very large uterus.

Examination 155.—2 hours after coitus. Condom shows many live spermatozoa.

Examination 156.—Live spermatozoa found on cervix.

We can thus conclude that in spite of the fact that she became pregnant twice by first husband and never in 7 years with the second husband, that the fault is with her and not with the husband. Without these investigations and simply going by the history, we would almost certainly have put the blame on the husband.

Mrs. S. J., age 34 (1908), tall and stout, married 15 years, and sterile. Periods normal. Mother had 14 children. Has married brothers and sisters, who all have children. Husband is tall and slim, age 42; mother had more than 10 children. His brothers and sisters have children. Neither husband nor wife are at all passionate, having coitus only once a week or once in two weeks. Patient has an acute anteflexion and a small vagina.

Examination 157.—2 hours after coitus and after one month's continence. Condom shows many lively spermatozoa, but very small.

Mrs. K. J., married 2 years (1907), and sterile. Periods every 4 or 5 weeks and painless. Has a very small, acutely anteflexed, retroverted uterus.

Examination 158.—2 hours after coitus. Condom shows many spermatozoa, but all dead. Condom felt cold. Another specimen was requested, but patient never came.

Mrs. A. J., age 24 (1909), small and stout, married 3 years, and sterile. Periods normal. Mother had 10 children. Married brothers and sisters have children. Husband had children by his

first wife. Both husband and wife are normally passionate, having coitus twice a week. Patient has a small uterus.

Examination 159.—2 hours after coitus and after 5 days' continence. Condom (which was cold when brought) shows many very small spermatozoa, almost all dead, but one live one was found. In view of the previous history, no other specimen was thought necessary.

Mrs. A. K., age 27 (1909), married 7 years, and sterile. Periods every 4½ weeks and slightly painful. Mother had 7 children. Two married brothers have children. Husband's mother had 8 or 9 children, and his married brothers have children. He is not at all passionate, but somewhat impotent. She is more passionate. She has a conical cervix.

Examination 160.—1½ hours after coitus and after 2 weeks' continence. Condom shows no spermatozoa. Patient informs me that 2 months before, semen was examined at one of our large public hospitals, and was also found without spermatozoa.

Husband gives history of having masturbated from the age of 14 till his marriage (at age of 20), and also a few times since marriage. Is partly impotent. Denies gonorrhea or other venereal disease, but has signs of double epididymitis.

Examination 161.—Aspiration of testicle shows many dead spermatozoa, but some lively tailless spermatozoa.

Mrs. L. K., age 19 (1908), married 3 years and

sterile. Periods normal. Mother had 6 children. Husband's mother had 4 children. Husband is not very passionate, but she is. Has an acute anteflexion.

Examination 162.—2 hours after coitus and 3 days' continence. Condom shows many spermatozoa, most of which are dead, but there are enough live ones.

The following is another very common case where a woman is operated upon for sterility, and in which the merest examination either of the husband or his semen would have shown such operation useless from the sterility point of view.

Mrs. M. K., age 28 (1908), married 6½ years, and sterile. Periods every 4 weeks, and painful. Mother had 9 children. Husband's mother had 6 children. Husband is very passionate, but she not at all. Patient has an acute anteflexion. Had a curettage and dilatation for sterility 7 months previously.

Examination 163.—2 hours after coitus and after 4 days' continence. Condom shows *no* spermatozoa.

Husband was told to come, and on examination I found one undescended testicle and the other atrophic.

Mrs. F. K., age 28 (1906), married 9 years, and sterile. Periods every 3½ weeks, lasting 6 days, and very painful on first day. Mother had 12 children, and husband's mother had 8 children. Husband is passionate, having intercourse 3 or 4 times

a week, but she is not at all passionate. Patient has a prolapsed left ovary, a retroverted uterus, and a large conical cervix.

Examination 164.—1½ hours after coitus. Condom shows many live spermatozoa.

I performed a dilatation and curettage and excised the redundant portion of the cervix.

Examination 165.—4 hours after coitus. Live spermatozoa found on cervix, but none in its interior.

Examination 166.—12 hours after coitus. Live spermatozoa found in interior of cervix.

Examination 167.—16 hours after coitus. No spermatozoa found either on or in cervix.

Examination 168.—34 hours after coitus. No spermatozoa found either on or in cervix.

Having satisfied myself at the operation that the uterus was of proper size and that there was no obstruction after the operation, and also the fact that live spermatozoa were found in interior of cervix as long as 12 hours after coitus, showing that there was nothing in the uterine secretion inimical to the life of the spermatozoon, I have come to the conclusion that the trouble must be higher up, either in the tubes or ovaries, most probably in the tubes, as the ovaries seem to functionate normally, judging from the menstrual history, and I have, therefore, advised an exploratory laparotomy, which patient is considering at present.

In the following case it is evident that the fault lies with the wife, and that as a result of patho-

logical changes in the uterus the spermatozoa cannot live therein. The fact that the patient had previously become pregnant and that the husband's semen shows live spermatozoa is enough to absolve him in this case from all responsibility. It is also not necessary to look higher up for a possible pathological condition either in the tubes or ovaries to account for the sterility as the examinations show sufficient reason in the uterus to fully account for it. (Unfortunately the diagnosis was forgotten to be put down.)

Mrs. R. K., age 29 (1909), married 5 years. Had a full term baby, which was born dead 4 years ago, and has been sterile since. No miscarriages. Periods normal. Mother had 11 children, and husband's mother had 4 children. Husband is fairly passionate, but she is not at all since confinement, but was very passionate before that.

Examination 169.—3 hours after coitus. No spermatozoa found at all, either about cervix or vagina.

Examination 170.—3 hours after coitus. Condom shows many lively spermatozoa.

Examination 171.—13 hours after coitus. No spermatozoa found anywhere. Patient then passed out of observation.

Mrs. Y. K., age 25 (1907), married 2 years, and sterile. Periods normal. Mother had 5 children, and husband's mother had 16 children. Husband is very passionate, having coitus every night, and

sometimes twice a night. She is also fairly passionate. She has an infantile uterus.

Examination 172.—2 hours after coitus and after 2 days' continence. Condom shows many lively spermatozoa.

This is another very common case where the woman is subjected to an operation for sterility and in which the husband is at fault.

Mrs. A. K., age 30 (1907), married 13 years, and sterile. Periods every 4 weeks, and very painful in spite of previous operation. Was operated on for sterility (curettage and dilatation) 3 years previously. Both husband and wife are very passionate. Patient has an acute anteflexion.

Examination 173.—4 hours after coitus and after 3 days' continence. Condom shows no spermatozoa.

Examination 174.—7 weeks later. 6 hours after coitus and after 2 weeks' continence. Condom shows no spermatozoa.

Mrs. B. L., tall and stout, age 30 (1907), married 9 years, and sterile. Periods every 3 weeks, and painful. Mother had 11 children. Husband, age 33, tall and very stout; his mother had 9 children. Husband is quite passionate, but she not at all. She has a small uterus. Had a dilatation in 1901, and again later in 1909, but never became gravid.

Examination 175.—5 hours after coitus and after 2 weeks' continence. Condom shows many lively spermatozoa.

The following case is quite interesting and the history speaks for itself.

Mrs. F. L., average build, age 28 (1909), and married 8 years. Had one child by first husband 7 years ago. Is now married 2 years with second husband, but has never been gravid by him. Periods every 4 weeks, and very painful. Mother had 14 children. Husband, average build, age 30, had a child by his first wife. Husband is very passionate, but she not at all. She has an endometritis.

Examination 176.—3 hours after coitus and after 3 days' continence. Condom shows many large and straight spermatozoa, almost all dead, but a few lively ones. It is possible that this is a case of one child sterility due to a gonorrheal infection, or it may be one of those rather rare cases in which both parties are normal and can impregnate with others, but not with themselves. The patient passed from observation after the first visit.

Mrs. L. L., married 3½ years (1906), and sterile. Periods every 4 weeks, and very painful. Patient has a very small uterus and a prolapsed left ovary.

Examination 177.—3 hours after coitus. Condom shows many lively spermatozoa.

Mrs. K. L., married 12 years (1907), and comes for sterility. Periods every 3½ weeks, and very painful. Her mother had 10 children, and her husband's mother had 7 children.

Examination 178.—Condom shows no spermatozoa after 2 weeks' continence. Husband had epididymitis.

Mrs. I. L., age 24 (1907), married 2 years, and sterile. Periods every 4 weeks, and very painful. Her mother had 5 children, and her husband's mother had 14 children. Both husband and wife are very passionate. She has a retroverted uterus, a conical cervix and a pinhole os.

Examination 179.—3 hours after coitus. Condom shows many live spermatozoa with thick heads and average tails.

Mrs. S. L., married 7 years (1907), and sterile. Periods every 4 weeks, lasting 5 days, and very painful. Neither husband nor wife are very passionate. Patient has an anteflexed uterus.

Examination 180.—1½ hours after coitus. Condom shows many very lively thin spermatozoa with very long tails.

Two years later (1909), in answer to a circular letter, I was informed that patient had had a dilatation, curettage with the insertion of a stem pessary in 1907, but had up till that time not become gravid. She has, however, become very passionate since the operation, while her husband is not very passionate.

Examination 181.—This examination was undertaken to investigate certain views expressed in *Haussmann's* work on spermatozoa.

Coitus 65 hours ago. Patient had been taking daily douches with salt water. About 3 hours be-

fore coming here patient had had an ichthyol-glycerin tampon inserted, which was removed one hour before coming here, followed by a phosphate of soda douche. No spermatozoa found either on cervix or in interior of uterus.

Examination 182.—66 hours after coitus, and no douche since. No spermatozoa found in cervical mucus or interior of cervix.

Examination 183.—18 hours after coitus and after 6 days' continence. No spermatozoa found in cervical mucus or in cervix.

Examination 184.—18 hours after coitus. No spermatozoa found anywhere.

Mrs. A. L., married 10 years (1906), and sterile. Periods regular. Husband served in the army in Europe for one year after marriage, during which time he was separated from his wife. Patient has a small uterus.

Examination 185.—1 hour after coitus. Condom shows no spermatozoa.

Examination 186.—After 6 days' continence. Condom shows no spermatozoa.

Husband was examined by me and shows signs of old double epididymitis. He admits having had gonorrhea, but does not remember any swelling of testicles.

Mrs. I. L., age 24 (1907), married 3 years, and sterile. Periods normal. Mother had 8 children and husband's mother (who died young) had 2 children. Husband is fairly passionate, and she not at all. She has a very small uterus.

Examination 187.—6 hours after coitus and after 2 days' continence. Condom shows many small lively spermatozoa.

Mrs. R. L., married 1½ years (1906), and already comes for sterility. Periods every month, lasting 7 days, and very painful. Has dyspareunia since 2 months. Patient has a very small anteflexed uterus.

Examination 188.—1½ hours after coitus. Condom shows many small spermatozoa, most of which are dead, but a few lively ones are also seen.

In the following case in all probability both parties are at fault. The woman represents a very common type, in which we have the combination of stoutness, infantile uterus, scant or infrequent menstruation and lack of sexual passion.

Mrs. F. L., tall and stout, age 26 (1908), married 4 years, and sterile. Periods had previously been regular and painless, but now has amenorrhea since 8 months. Mother had 11 children. Husband is tall and stout, age 31, and his mother had 5 or 6 children. Husband is very passionate, but she not at all. She has an infantile uterus.

Examination 189.—5 hours after coitus and after 5 days' continence. No spermatozoa found anywhere in genitalia.

Examination 190.—After 3 days' continence. Condom shows no spermatozoa.

In the following case we have practically the same type of woman as in the previous case, and curiously enough, the two examinations of the hu

band's semen leave it at least in doubt whether he is not also at fault.

Mrs. S. L., tall and stout, age 29 (1908), married 9 years, and sterile. Periods every 4 weeks (in this she differs from previous case), and painless. Mother had 10 children, has 3 married sisters who all became gravid. Husband, age 29, small and stout; his mother had 14 children. Husband is very passionate, but she not at all. She has a small uterus.

Examination 191.—2 hours after coitus and after 12 days' continence. Condom shows a large number of spermatozoa with long tails, but all *dead*.

Examination 192.—2 hours after coitus and after 3 days' continence. Condom shows little semen, but many spermatozoa with large straight tails, but all *dead*.

Mrs. MacP. comes suffering from amenorrhea and sterility. She has a small uterus. Had an *Alexander* operation 4 years previously and a dilatation 6 months before examination.

Examination 193.—2 hours after coitus. Live spermatozoa found on cervix.

Examination 194.—Many live spermatozoa found in vagina and in cervix. This was one of my earlier cases (1906), and hence the history is incomplete.

Mr. and Mrs. J. M.—Mrs. J. M., age 27 (1909), married 7 years, and sterile. Periods normal. Mother had 9 children. Two married brothers

have children. Husband, age 34; his mother had 14 children. Two married brothers and one married sister have children. Another sister, married 20 years, is also sterile. Husband is fairly passionate, and she not at all. She has a small uterus.

Examination 195.—1 hour after coitus and after 4 days' continence. Condom shows no spermatozoa.

Examination 196.—1 hour after coitus and after one week's continence. Condom shows one or two live spermatozoa moving feebly, and one or two dead ones.

The husband was interviewed, and he denied all venereal troubles. He gives a history as follows: When young had both testes swollen for some unknown reason. Examination shows the right testicle small and atrophic, and the left one is large and is complicated by a varicocele and hernia. Prostate is very small. No stricture of urethra.

Examination 197.—1 hour after coitus. Prostatic secretion contains no spermatozoa.

Examination 198.—Puncture (aspiration) of testicle brings out a large amount of serous fluid in which one lively spermatozoon was found. In this case I advised having the varicocele removed with the hope of possibly improving the circulation and nutrition of the one good testicle. He never responded to my letter, so I cannot report upon the further progress of the case.

Mrs. S. M., age 24 (1907), tall and well built,

married 4 years, and sterile. Periods every 3 weeks, and very painful. She is not at all passionate, while husband is quite so. She has an infantile anteflexed uterus.

Examination 199.—3 hours after coitus and after 2 days' continence. Condom shows many normal live spermatozoa.

Mrs. K. M., tall and well built, age 30 (1908), was married 10 years to her first husband, and is now married 2 years to the present one. Is sterile. Periods every 2–4 weeks, and very painful. Was operated on for sterility (nature of operation not known) one year ago. Her mother had 9 children. Husband, age 35, is of average size. His mother (who died young) had 4 children. He is fairly passionate, but she is more so.

Examination 200.—2 hours after coitus and after one week's continence. Condom shows many lively spermatozoa. Patient has a chronic endometritis.

Mrs. C. M., age 32 (1908), of small and slim build, has been married 4 years, and is sterile. Periods normal. Mother had 14 children. Husband, age 28, is tall and well built; his mother had 7 children. Husband is fairly passionate, but she is more so. She has an anteflexed and retroverted uterus and a prolapse of one ovary.

Examination 201.—3 hours after coitus and after one day continence. Condom shows many lively spermatozoa.

Patient was operated on for sterility (nature of

operation not known), but when last heard of, about two years after operation, she had not become gravid.

Mrs. B. N., age 27 (1908), married 4½ years. Had a two month's miscarriage immediately after marriage and a curettage two years ago. Periods every 4 weeks, and very painful. Mother had 5 children. Her only married sister has children. She is tall and slim, and her husband is tall and stout. His mother had 15 children. Husband is very passionate, and she is fairly so. They have coitus every night, and sometimes more than once a night. She has an acute anteflexion.

Examination 202.—2 hours after coitus and after 4 days' continence. Condom shows very few spermatozoa, mostly dead, but one or two motile ones.

Mrs. S. N., age 28 (1908), married 7 years, and sterile. Periods every 3 weeks, and very painful. Her mother had 5 children and her husband's mother had 6 children. Husband is quite passionate, and she is fairly so. She has a conical cervix and retroversion.

Examination 203.—18 hours after coitus and after 3 days' continence. No spermatozoa found on cervix.

Examination 204.—Condom shows live spermatozoa.

Mrs. S. O., tall and average size, age 23 (1907), married 3 years, and is sterile. Periods every 4 weeks, and very painful. Mother had 7 children.

Husband is 24 years old, is tall and stout, and his mother had 6 children. Husband is fairly passionate, but she not at all. She has an acute anteflexion.

Examination 205.—4 hours after coitus. Condom shows many live spermatozoa.

Examination 206.—19½ hours after coitus. Cervix shows live spermatozoa. Fundus shows spermatozoa, but they are all dead.

Mrs. R. P., tall and stout, age 30 (1908), married 7 years, and sterile. Periods every 4 weeks, and very painful. Her mother had 10 children. Her husband is 32 years old, very tall, but not stout. His mother had more than 4 children. Both husband and wife are fairly passionate. She has a conical cervix.

Examination 207.—4 hours after coitus and after 2 days' continence. Condom shows many dead spermatozoa and a few live ones, but with very feeble motion.

Mrs. I. P., age 25 (1908), very stout, married 7 years. One year after marriage had a 6 month's miscarriage, and has been sterile since. Periods every 3 weeks, and very painful. Her mother had 9 children, and all her married sisters have children. Her husband is 28 and even stouter than she. His mother had 6 children. He is very passionate, having coitus every night and sometimes twice a night, and she is also fairly passionate. She has an acute anteflexion.

Examination 208.—2 hours after coitus and

after 4 days' continence. Condom shows enough lively spermatozoa.

Patient was operated on for sterility (nature of operation not known), but 8 months later had not become gravid.

Mrs. S. P., average build, age 23 (1908), married 2 years, and sterile. Periods every 3½ weeks, very profuse and painful. Husband is only fairly passionate, but she is not at all passionate. She has an infantile uterus.

Examination 209.—2 hours after coitus and after 3 weeks' continence. Condom shows many lively spermatozoa.

Mrs. N. R., age 28 (1907), well built, married 6 years, and sterile. Periods normal. Mother had 12 children. Husband is also well built, and his mother (who died young) had 3 children. Husband is quite passionate, but she not at all.

Examination 210.—3 hours after coitus and after 5 days' continence. Condom shows very little semen and absolutely no spermatozoa. Husband denies all venereal history, but has signs of an old left epididymitis.

Mrs. E. K., age 35 (1907), tall and stout, married 11 years, and sterile. Mother had 9 children. Husband, age 40, is tall and well built, and his mother had 8 children. Both husband and wife are fairly passionate. She has a conical cervix.

Examination 211.—3 hours after coitus and 2 weeks' continence. Condom shows no spermatozoa.

Examination 212.—2 hours after coitus and after 6 days' continence. Condom shows no spermatozoa.

Mrs. R. N., married 11 years (1906). One year after marriage had one child, which died 6 weeks after birth, and 2 years later had a 5 weeks' miscarriage, and has been sterile since. Had twice curettage; last one 3 years ago. In spite of operations she has very painful periods, coming every 3½ weeks. She has a small anteflexed uterus with great tendency to bleed.

Examination 213.—9 hours after coitus. Many live spermatozoa found in condom.

Mrs. S. R., small and thin, age 32 (1909), was married 3 years to her first husband and had a child, and is now married 5 years to present husband, and has been sterile with him. Present husband is hardly passionate, and she not at all since second marriage. She has endometritis.

Examination 214.—4 hours after coitus and after 5 days' continence. Condom shows no spermatozoa.

Examination 215.—Condom shows many lively spermatozoa.

Mrs. T. R., small and not stout, age 23 (1909), is married 5 years, and sterile. Periods every 6 weeks, scanty and painless. Her mother had 10 children, and a married sister has a child. Her husband is 27 years old, and his mother had 11 children, and a married sister has children. Hus-

band is fairly passionate, but she not at all. She has a small uterus.

Examination 216.—1 hour after coitus and after 2 days' continence. Condom shows many lively spermatozoa.

Examination 217.—1 hour after coitus, shows a large amount of semen in fornix, in which are found very many lively spermatozoa and an equal amount of dead ones. No spermatozoa at all in cervix. This was another example of the combination of scant periods, absence of sexual passion and sterility.

Mrs. R. R., tall and slim, age 20 (1908), married 3 years, and sterile. Periods normal. Her mother had 14 children. Her husband, age 20, is stout, and his mother had more than 5 children. He is very passionate, and she is fairly so. She has a small uterus.

Examination 218.—7 hours after coitus and after 4 days' continence. Condom shows many lively spermatozoa.

Mrs. Y. S., age 25 (1907), married 4 years, and sterile. Periods normal. Her mother (who died young) had 7 children, and her husband's mother had 12 children. Both husband and wife are very passionate. She has a small uterus.

Examination 219.—2 hours after coitus and after 2 weeks' continence. Condom shows no spermatozoa.

Mrs. M. S., tall and of average build, age 30

(1908), has been married 5 years. Had a 7 weeks' miscarriage 6 months after her marriage, and has been sterile since. Periods every 4 weeks, very scant and somewhat painful. Her mother (who died young) had 4 children, and her husband's mother had 10 children. Her husband is not very passionate, and she not at all. When single, had part of ovaries removed for cysts. She has an acute anteflexion and stenosis and a rather tender left ovary.

Examination 220.—2½ hours after coitus and after one week's continence. Many live spermatozoa found on cervical mucus, but moving rather feebly.

Mrs. A. S., age 38 (1908), married 7 years. Was married once before and had a child. By present husband she also had a child 5½ years ago, and has been sterile since. Periods every 4 weeks, and have been very painful since birth of child. Husband had been married 11 years with his first wife and had 5 children. She has a chronic endometritis and an eroded cervix. Both husband and wife are very passionate.

Examination 221.—2 hours after coitus and after 5 days' continence. Condom shows very many lively spermatozoa.

Mrs. A. S., tall and well built, age 23 (1908), has been married 4 years, and is sterile. Periods, as a general rule, come every 4 weeks, but are sometimes 2–4 weeks over time. Her mother had 7 children. Husband, age 28, of average build. His mother had 5 children. He is very passionate, but

she not at all, possibly due to dyspareunia. She has stenosis of os.

Examination 222.—2 hours after coitus and after 12 days' continence. Condom shows no spermatozoa.

Mrs. L. S., of average build, age 22 (1907), married 1½ years, and complains of sterility. Periods come every 3 weeks and last 6 days, and are very painful. Her mother had 9 children. Husband's mother had 7 children. Husband is fairly passionate, and she not at all. She has a very acute anteflexion.

Examination 223.—3 hours after coitus and after 2 weeks' continence. Condom shows live spermatozoa.

Mrs. I. S., tall and well built, age 26 (1908), married 11 years, and sterile. Periods every 3½ weeks, and slightly painful. Her mother had 9 children. Has one married sister who is pregnant. Her husband is 24 years old, tall and slim. His mother had 9 children. Has married brothers and sisters who have children. Both husband and wife are very passionate. She has an infantile uterus.

Examination 224.—1 hour after coitus and after 2 days' continence. Condom shows very many lively spermatozoa.

Mrs. B. S., tall and stout, age 30 (1907), married 2 years, and sterile. Periods every 3½ weeks, and very painful. Mother had 6 children. Husband is tall and slim, age 31. Both husband and wife are very passionate, having coitus every night,

and sometimes twice a night, although she has dyspareunia. She has an acute anteflexion and vaginismus.

Examination 225.—1½ hours after coitus and the second coitus that night. Condom shows an enormous amount of spermatozoa, mostly dead, but also many live ones.

Mrs. S. S. (one of my earliest cases, hence history is incomplete), is sterile (1906). She has a small uterus and minute os and a double vagina.

Examination 226.—Condom shows spermatozoa.

Mrs. A. S., age 39 (1908), tall and stout, married 13 years, and sterile. Periods every 4 weeks, and painful. Her mother had 5 children, and she has 4 married brothers who have children. Her husband is 44 years old, small and stout; his mother had 2 children. Neither husband nor wife are passionate. She has a conical cervix.

Examination 227.—2 hours after coitus and after 2 weeks' continence. Condom shows many lively spermatozoa with very small tails.

Mrs. J. S., married 1½ years, and comes for sterility (1906). Periods are very irregular, coming every 4, 5 or 6 weeks, and very painful. She has a slight anteflexion.

Examination 228.—Condom shows no spermatozoa.

Examination 229.—Condom shows no spermatozoa. Her husband had double epididymitis.

Mrs. B. K., tall and well built, age 28 (1907), married 9 years, and is sterile. Periods every 4 weeks, and very painful. Her mother had 7 children, and her husband's mother had 8 children. Her husband is not passionate, and she slightly more than he is. She has an acute anteflexion and a left ovarian cyst.

Examination 230.—3 hours after coitus and after one week's continence. Condom shows an enormous amount of small and very lively spermatozoa.

Mrs. A. S., age 27 (1907), married 4 years, and sterile. Periods normal. Her mother had 10 children and her husband's mother had 5 children. Her husband is fairly passionate, but she is very little so. She had a curettage and dilatation 2 years ago, but still has an acute anteflexion and a lateral version sinistra.

Examination 231.—Condom shows many live spermatozoa.

Mrs. A. S., age 22 (1909), married 3 years, and sterile. Periods normal. Her mother had 11 children, and her husband's mother had 3 children. Both husband's and wife's brothers and sisters are married and have children. Husband is fairly passionate, and she a little more so. She has an acute anteflexion.

Examination 232.—½ hour after coitus and after 6 days' continence. Condom shows many small lively spermatozoa. (Patient has a markedly anteflexed uterus and a left salpingo-oophoritis.)

Examination 233.—2 hours after first coitus after period. Cervix shows no spermatozoa.

Examination 234.—19 hours after coitus. No spermatozoa on cervix.

Examination 235.—18 hours after coitus, and 13 hours after a phosphate of soda douche (douche was taken 5 hours after coitus) shows: Vaginal mucus markedly alkaline and a few dead spermatozoa found in vagina.

No spermatozoa found either on plug of mucus, which closed cervical os or interior of cervix, after removing the plug.

Examination 236.—45 hours after coitus and 12 hours after a plain water douche. No spermatozoa found in vagina or in cervical mucus.

Mrs. R. S., tall and average build, age 32 (1908), married 3 years, and sterile. Periods every 3½ weeks, and sometimes painful. Her mother had 9 children and her husband's mother had more than 5 children. Both husband and wife are very passionate. She has an acute anteflexion and a polyp which I, however, removed before these examinations were commenced. Although the uterus is markedly anteflexed, the sound can be made to easily enter the fundus through the wide open cervical os and large cervical canal. The os is, however, almost always filled by a plug of mucus. During the 2 months the patient was under treatment the os and cervical canal received applications of tincture of iodine, and on one occasion a 50% silver nitrate solution was applied to the cervix.

Examination 237.—3 hours after coitus and after 6 days' continence. Condom shows many lively spermatozoa.

Examination 238.—4 hours after coitus. Only one dead spermatozoon is found in fornix and none anywhere else in genitals.

Examination 239.—3 hours after coitus and after 14 days' continence, and also after a phosphate of soda douche before coitus. Some dead spermatozoa are found on the external genitals, but none inside.

Examination 240.—5 hours after coitus and after 2 weeks' continence, and after a phosphate of soda douche was used 6 hours before coitus. No spermatozoa found anywhere.

Mrs. N. S., small and somewhat stout, age 28 (1908), married 8 years, and sterile. Periods every 4 weeks, and very painful. Her mother had 3 children. Her husband, age 30, is tall and stout; his mother had 5 children. Both husband and wife are very passionate, having coitus 5 times a week, and sometimes twice a night. She has a small uterus.

Examination 241.—4 hours after coitus and after 4 days' continence. No spermatozoa found in vaginal or cervical mucus.

Mrs. E. S., of average size, age 24 (1908), married 4 years, and sterile. Periods are now every 4 weeks, and painless, although previously she had them every 6 to 8 weeks, and 18 months ago had

amenorrhea for 4 months. Her mother had 8 children, and her married sisters all have children. Her husband is also of average build, age 28, and his mother had over 8 children. Both husband and wife are very passionate. She has a small uterus.

Examination 242.—2 hours after coitus and after 4 days' continence. Condom shows no spermatozoa.

Examination 243.—2 hours after coitus and after 4 days' continence. Condom shows one or two dead spermatozoa, but no live ones.

Mrs. J. S., age 29 (1909), married 2 years and comes for sterility. Periods every 2½ to 3 weeks, and are painful since marriage. Her mother had 9 children, and all her married brothers and sisters have children. Husband, age 29; his mother had 13 children, and all his married brothers and sisters have children. Both husband and wife are fairly passionate. She has a small uterus.

Examination 244.—3 hours after coitus and after 5 days' continence. Condom (which was brought cold) shows many spermatozoa, almost all dead, but some are seen feebly moving.

Mrs. P. S., married 4 years (1907) to present husband, and was married 5 years to her first husband, but has always been sterile. Age 33, large and well built. Periods every 4 weeks, and very painful. Her mother had 11 children. Her husband is 47 years old, and much taller and stronger than she is. His mother had 3 or 4 children. He is fairly passionate, but she not at all.

She has an acute anteflexion, in spite of a dilatation only a few months before.

Examination 245.—Condom shows normal live spermatozoa.

Mr. and Mrs. I. S.—Mrs. S., age 26 (1908), married 8 years, and sterile. Periods normal. Mother had 13 children, and 2 married sisters have children. She has an endometritis. Both she and her husband are very passionate.

Examination 246.—2 hours after coitus and after 1 week's continence. Condom shows no spermatozoa.

Husband was examined and gave a history of a right epididymitis. His left testicle is small, and the right one shows a thickened epididymis. His prostate is very much enlarged.

Examination 247.—Prostatic secretion (obtained by massage) shows no spermatozoa, but red blood cells.

Mrs. E. S., age 34 (1908), married 12 years, and sterile. Periods every 4 weeks, and very painful. Her mother has 12 children, and 4 of her sisters are married and have children. Husband's mother had 8 children. Both husband and wife are very passionate. She has an acute anteflexion.

Examination 248.—3 hours after coitus and after 3 days' continence. Condom shows an enormous number of very small and very lively spermatozoa.

Mrs. Y. S., tall and rather stout, age 26 (1907),

married 8 years, and sterile. Periods every 3 weeks, scant and only slightly painful. Her mother had 11 children. Husband, age 32, is tall and well built, and his mother had 10 children. Husband is very passionate, having coitus every night, and sometimes twice a night, and she is fairly passionate. She has a normal uterus, not anteflexed, but a pinhole os.

Examination 249.—4 hours after coitus and after 2 weeks' continence. Condom shows very many very small spermatozoa, most of which are dead, but some very lively ones are seen.

Mrs. L. S., age 30 (1907), tall and stout, and married 4½ years. She thinks she had a 9 weeks' miscarriage 3 years ago, but is not certain, otherwise she has been sterile. Periods normal. Her mother had more than 5 children. Husband is 30 years old, tall and slim, and his mother had 12 children. Both husband and wife are fairly passionate. She has a markedly inflamed cervix. Her husband had a gonorrhea before marriage and a swollen testicle 2 years ago.

Examination 250.—1½ hours after coitus and after 2 days' continence. Condom shows very many lively spermatozoa. We thus see that in spite of the husband's history he is able to ejaculate normal spermatozoa.

Mrs. G. T., age 34 (1907), tall and slightly stout, married 9 years, and sterile. Periods normal. Her mother had 10 children. Husband is tall and slim, and his mother had 5 children. He

is very passionate, but she not at all. She has a small uterus.

Examination 251.—2 hours after coitus and 3 days after masturbation. Condom shows no spermatozoa.

Mrs. R. T., married 6½ years (1906), and is sterile. Periods normal. She has an acute anteflexion.

Examination 252.—Condom shows no spermatozoa. The husband was examined and questioned, and an old standing double epididymitis was discovered which, according to the history, was of 8 years' duration.

Mrs. V. R., age 28 (1908), married 8 years, and sterile. She is tall and stout. Periods every 3½ weeks, and somewhat painful. Had a curettage 5 months ago, but no after-treatment. Her mother had 11 children. Husband is 38 years old; his mother had 8 children. Both are quite passionate. She has a small uterus, acutely anteflexed.

Examination 253.—4 hours after coitus and after 1 day's continence. Condom shows many lively spermatozoa with short tails.

Mrs. M. V., married 8 years (1907), and sterile. Had dilatation 4 years ago. Periods every 3 and 3½ weeks, and no pain. Husband is very passionate, but she not at all. They have intercourse twice every night for one week, and then once every night for the next week. She has an acute anteflexion in spite of the operation.

Examination 254.—2 hours after coitus. Condom shows many minute lively spermatozoa.

Mrs. B. V., age 28 (1909), married 8 years, and is sterile. Periods normal. Her mother had 8 children, and her married brothers have children. Both husband and wife are very passionate, having coitus every night.

Examination 255.—1½ hours after coitus and after 5 days' continence. Condom shows no spermatozoa.

Mrs. I. W., tall and stout, age 29 (1908), has been married 12 years, and is sterile. Periods every 5 or 6 weeks, and painless. Her mother had 11 children, and her married sisters have children. Husband's mother had 8 children, and his married brothers and sisters have children. Both husband and wife are fairly passionate.

Examination 256.—4 hours after coitus and after one week's continence. Condom shows no spermatozoa.

Examination 257.—Six weeks later and after one week's continence. Condom shows no spermatozoa.

The husband was then interviewed and examined, and he gives a history of a gonorrhea followed by a left epididymitis 10 years ago. He, however, shows signs of an old *double* epididymitis.

Examination 258.—After one day's continence. Prostatic fluid obtained by massage shows no spermatozoa.

Examination 259.—Aspiration of right testicle shows one or two dead spermatozoa (motionless) and several minute, probably tailless spermatozoa, which exhibit motion-like normal spermatozoa, but have no tails.

Mrs. L. W., married 6 years (1907). She says she had a 3 weeks' miscarriage 8 months ago, but in view of the fact that her periods have always been irregular and frequently are as much as 10 days overdue, it is a question whether this might not have been simply a delayed period. Periods are sometimes accompanied by severe pains and sometimes are entirely painless. She is 28 years old, very stout, and her mother had 9 children. Husband's mother also had 9 children. Neither he nor she are passionate. She has a retroversion and cystocele, and had once been curetted.

Examination 260.—1 hour after coitus. Condom shows many live spermatozoa. Two months later patient entered the hospital, where a curettage, an anterior colporrhaphy and a vaginal suspension of the uterus by the round ligaments were performed, but upon the last information, two years later, she had not become pregnant.

Mrs. S. W., tall and well built, age 28 (1908), has been married 7½ years, and is sterile. Periods every 4 weeks, and always very painful. Her mother had 5 children, and her married sisters have children. Husband's mother had 5 children. Husband is quite passionate, but she is more so. She has an infantile uterus.

Examination 261.—1 hour after coitus and after 3 days' continence. Condom shows many lively spermatozoa with very large heads, but small tails.

Mrs. R. W., tall and well built, age 20 (1908), has been married only 1½ years, and comes for sterility. Periods every 3–5 weeks, and no pain. Her mother had 3 children. Husband, age 24, short and stout; his mother had 5 children, and all of his married brothers have children, except one, who has no family after 8 years of married life. Both husband and wife are very passionate. She has an acute anteflexion.

Examination 262.—½ hour after coitus and after 5 days' continence. Condom shows many lively spermatozoa.

Examination 263.—6 hours after coitus. No spermatozoa found anywhere in genitals.

In the following case the husband was obviously at fault, and a very prominent surgeon advised the operation of epididymo-vasostomy (*Martin's* operation), but, as the result of my study of his condition, as will be seen by the examinations, I did not encourage him to have it done, as I did not think it could possibly be of any use.

Mrs. M. W., age 30 (1908), has been married 10 years, and is sterile. Periods normal. Her mother had 12 children. Her husband is very passionate, but she not at all. She has an acute anteflexion.

Examination 264.—1 hour after coitus and

after 2 weeks' continence. Condom shows no spermatozoa.

The husband was then interviewed and examined. He denied any venereal infection, although he served in the army. Examination showed signs of an old double epididymitis. Prostate is enlarged. Urine normal.

Examination 265.—After 8 days' continence. Aspiration of right testicle shows no spermatozoa.

Examination 266.—2 hours after coitus and after 16 days' continence previous to said coitus. Aspiration of left testicle shows no spermatozoa.

Examination 267.—At same time as above. Massaged prostate, but no spermatozoa found in expressed fluid.

Mrs. I. W., age 27 (1909), of average size, has been married 7 years, and is sterile. Periods normal. Her mother had 8 children. All her married sisters have children. Husband, age 33, of average build, had one child by his first wife. His mother had 8 children, and all his married brothers and sisters have children. He is fairly passionate, but she hardly at all. She has a very small uterus.

Examination 268.—2½ hours after coitus and after 5 days' continence. Condom shows lively spermatozoa.

Mrs. M. W., tall and average build, age 25 (1909), married 2½ years, and is sterile. Periods come every 4 weeks, are painless, but last only one day. Her mother had 10 children. She has a very tight vagina, and does not think her husband

gets in her well. She had a curettage and dilatation one year ago. Her husband is very passionate, but she not at all.

Examination 269.—5 hours after coitus. Only a few dead spermatozoa found in cervix.

Examination 270.—4 hours after coitus. Many live spermatozoa (but more dead ones) found in condom.

Examination 271.—3 hours after coitus. No spermatozoa found on cervix. In this case I believe the narrowness of the vagina prevents the husband having proper intercourse.

Mrs. R. W., age 23 (1907), married 4 years, and is sterile. Periods every 4 or 5 weeks, and not painful. Her mother had 12 children. She has a marked retroversion. Husband is very passionate, and she is moderately so.

Examination 272.—3 hours after coitus and after 2 weeks' continence. Condom shows no spermatozoa.

The husband was then interviewed, and it was discovered that he had a gonorrhea one year before marriage, but denies having had a swollen testicle. On examination I find his right testicle small and his left one shows signs of an old epididymitis.

Examination 273.—3 hours after coitus and after 12 days' continence. Condom shows very few live spermatozoa.

The husband was treated by massage of the prostate, the passage of sounds into his prostatic

urethra, and also the instillation of weak silver nitrate solutions into his prostatic urethra (such treatment in other patients having been followed by improvement), but without any benefit, as will be seen by the subsequent history.

Examination 274.—5 hours after coitus and after 2 weeks' continence. Condom shows no live spermatozoa, and only 1 or 2 dead ones.

Examination 275.—3 hours after coitus. No spermatozoa either in vagina, cervix or fundus uteri.

Examination 276.—4 hours after coitus and after 2 weeks' continence. No spermatozoa found anywhere in genital tract.

Examination 277.—Condom only shows one dead spermatozoon after 11 days' continence.

Examination 278.—Condom shows quite a few dead spermatozoa and 1 live one after 2 weeks' continence.

The above examinations had been made at long intervals, and the entire treatment extended over one year. Four years later, in response to a letter, she informed me that she had never become gravid, but had submitted to a laparotomy for her condition.

Mrs. C. Z., small and stout, age 22 (1907), married 4 years, and sterile. Periods normal. Her mother had 2 children. Husband, age 27, is tall and slim, and his mother had 7 children. He is very passionate, and she is fairly so. She has an acute anteflexion.

Examination 279.—1½ hours after coitus and after 3 days' continence. Condom shows no spermatozoa.

Examination 280.—Two weeks later, and after 1½ weeks' continence. Condom shows no spermatozoa.

Examination 281.—18 hours after coitus, no spermatozoa found on cervix.

Examination 282.—3 hours after coitus and after 10 days' continence. Condom shows no spermatozoa.

Mrs. I. A., has been married 2½ years (1910), and had a 3 months' miscarriage six months after her marriage, but has been sterile since. Has had one curettage, but in spite of operation has dysmenorrhea and leucorrhea. Examination shows a markedly anteflexed uterus with a very long cervix and endocervicitis. I performed an amputation of the cervix (partial) besides curettage and dilatation.

Examination 283.—7 hours after coitus; many dead spermatozoa found in interior of cervix.

Examination 284.—After a phosphate of soda douche. 18 hours after coitus. Live spermatozoa found in interior of uterus.

Mrs. R. B., has been married 11 years; had a child one year after marriage, which died 3 days after birth, and has been sterile since. Both husband and wife are very passionate. She has an endometritis.

Examination 285.—53 hours after coitus and

after 5 days' continence shows many dead spermatozoa just within cervix and one or two dead ones at fundus uteri.

Examination 286.—3½ hours after coitus, shows many live spermatozoa just within cervical os.

Mrs. S. B.—This is the subsequent history of the case previously reported on page 148 (Exam. 87). Five years later (1912), in response to my letter, she informed me that she had never become gravid. The husband was examined and found to have had a double epididymitis.

Examination 287.—Aspirated left testicle and found a fair amount of clear fluid, and after examining many slides, finally found one with a large number of spermatozoa with straight tails, but lifeless.

Mrs. L. B., age 23 (1911), is rather stout and has been married 3 years, and is sterile. Periods normal. Both husband and wife are normally passionate. Her pelvic examination is entirely negative.

Examination 288.—2 hours after coitus and after 5 days' continence. Condom shows many lively spermatozoa.

Mrs. L. F., age 32 (1912), has been married 6 years, and is sterile. Her mother had 9 children and 2 miscarriages, and husband's mother had 7 children. Both she and her husband have married brothers and sisters who have children. Both are

normally passionate. Patient has a large retroverted uterus.

Examination 289.—4 hours after coitus and after 5 days' continence, shows many very lively spermatozoa with very long tails, within cervix, but none at fundus.

Mrs. S. F., age 28 (1911), has been married 2 years, and comes for sterility. Both husband and wife are normally passionate. She has a marked vaginismus and a vaginal fold of mucus membrane within the vagina, which has to be pulled apart to reach the cervix.

Examination 290.—11 hours after coitus and after 2 weeks' continence, shows live spermatozoa within the cervical os.

The above case is another proof of the value of the cervix test for sterility. When the patient came to the clinic it was taken for granted that it was this vaginal fold which was the cause of the sterility, as it did not seem at all possible for spermatozoa to be able to reach the cervix.

Mrs. A. F., age 26 (1911), has been married 5 years, and is sterile. Periods every 2 months, and very painful. Husband is fairly passionate, but she not at all.

Examination 291.—1 hour after coitus and after 5 days' continence. Condom shows no live spermatozoa, but many dead ones and mostly deformed. Another specimen was asked for, and the husband was requested to come, but that was the last I saw of the patients.

Mrs. J. F., age 35 (1908), has been married 11 years, and is sterile. She is very stout, has her periods every 3½ weeks, with great pain. Her mother had 7 children. Both husband and wife are normally passionate. She has an acute anteflexion.

Examination 292.—2 hours after coitus and after 6 days' continence. Condom shows many very small spermatozoa, but all dead.

Examination 293.—2 hours after coitus and after 4 days' continence. Condom shows many spermatozoa of all sizes, but all dead.

The husband was then interviewed and examined. He denied any venereal infection, but drinks very much beer and some whiskey. His coitus is normal, urination normal and not by night. Examination shows a slight varicocele, and a greatly enlarged prostate. No stricture and an endoscopic examination of the urethra shows it to be normal. Urine normal.

Examination 294.—Prostatic fluid obtained by massage shows no spermatozoa.

Mrs. Y. F., age 30 (1909), has been married 4 years, and is sterile. She is tall and rather stout, periods are normal, and she has a markedly retroflexed uterus and endometritis. Her husband is very passionate, and she is fairly so.

Examination 295.—2 hours after coitus shows a few lively spermatozoa in interior of cervix.

Mrs. L. F., age 23 (1911), has been married 6 years, and is sterile. Her husband is normally

passionate, but she not at all. She has a marked retroflexion.

Examination 296.—Condom shows normal spermatozoa.

Mrs. E. F., has only been married one year, and comes complaining of sterility. Periods are very irregular, coming sometimes every 7 or 8 weeks, and sometimes every 4 weeks. She has a regular internal vaginal apronlike fold of mucous membrane, which greatly interferes with the examination. Her husband's penis is all right. He is normally passionate, but she is more so.

Examination 297.—45 hours after coitus. No spermatozoa found either in cervix or in fundus.

Examination 298.—2½ hours after coitus and after 3 days' continence. Condom shows many lively spermatozoa.

CHAPTER XVII

Examinations and Experiments (*Continued*)

In the following case, from the history and as a result of the examination, a curettage was distinctly indicated, and was followed by the finding of live spermatozoa within the cervical os.

Mrs. C. G., age 27 (1911), has been married 7 years, and had one child 6 years ago, but has been sterile since. The periods are normal. She is not very passionate, and has had dyspareunia since childbirth, and has also had no feeling during coitus for the same time. Examination shows a normal uterus, slightly anteflexed, some endometritis, a slight laceration of the cervix and perineum, and an enlarged and prolapsed right ovary.

Examination 299.—3 hours after coitus and after 1 week's continence. Condom shows many lively spermatozoa.

Examination 300.—14 hours after coitus and after 3 days' continence. No spermatozoa found either in vagina, cervix, or fundus.

Examination 301.—14 hours after coitus, shows no spermatozoa in cervix.

Examination 302.—3 hours after coitus and after 5 days' continence, and after a phosphate of

soda douche, shows no spermatozoa either in cervix or at fundus.

I then did a dilatation and curettage.

Examination 303.—3 weeks after operation. 3½ hours after coitus and after 3 weeks' continence, shows no spermatozoa anywhere in genitals.

Examination 304.—After a phosphate of soda douche, dead spermatozoa are found in vagina and cervix.

Examination 305.—18 hours after coitus shows dead spermatozoa in cervix.

Examination 306.—4 hours after coitus shows live spermatozoa in cervix.

Mrs. G. G., age 37 (1909), has been married 10½ years, and had one child 6 years ago, which died during delivery. Periods every 3½ weeks and very painful. Had an *Alexander* operation one year ago.

Examination 307.—6 hours after coitus shows many dead spermatozoa in vagina and many live ones (and also many dead ones) in interior of cervix.

Examination 308.—2 hours after coitus, shows dead spermatozoa in vagina and cervix.

Examination 309.—19 hours after coitus, shows dead spermatozoa in cervix. Patient later informed me that she was told after the operation that she would probably not get any more children.

Mrs. G. J., age 28 (1909), has been married 8

years, and is sterile. Periods every 2 weeks, and very painful since marriage. Her mother had 9 children, and all her married brothers and sisters have children. She is small and stout. Her husband is tall and slim, age 30; and his mother had 6 children, and all his married brothers and sisters have children. He is fairly passionate, but she not at all.

Examination 310.—2 hours after coitus and after 4 days' continence. Condom shows an enormous number of spermatozoa, almost all dead, with straight tails, but a few feebly moving.

Mrs. J. G., is only married one year (1911), and comes for sterility. Periods every 4 weeks and very painful. Both she and her husband are very passionate. She has a marked retroflexion.

Examination 311.—2½ hours after coitus and after 6 days' continence. Condom shows many lively spermatozoa.

Examination 312.—1½ hours after coitus, shows dead spermatozoa at os, but live ones within cervical canal.

Mrs. L. G., age 24 (1911), has been married 9 years, and had a baby one year after marriage, and has been sterile since. Periods every 4 weeks and very painful. Husband is very passionate, but she very little. She has an acutely anteflexed uterus, which to feel appears almost infantile, but on sounding is found almost normal.

Examination 313.—7½ hours after coitus. Condom shows very many spermatozoa, but all dead.

Examination 314.—5 hours after coitus, shows only a few spermatozoa in vagina and cervix, but all dead. Patient then passed from observation.

Mrs. H. H., age 41 (1907), has been married 21 years, and still comes for sterility. Periods every 3½ to 4½ weeks, and very painful. She has a slight anteflexion and a chronic endometritis. Her husband is very passionate, but she not at all.

Examination 315.—5 hours after coitus and after 5 days' continence. Condom shows no spermatozoa.

Examination 316.—5 hours after coitus and after 5 days' continence. Condom shows no spermatozoa.

Examination 317.—5 months later. Condom shows no spermatozoa 4 hours after coitus. And still this patient had 7 dilatations for her sterility.

Mrs. Y. H., tall and stout, age 28 (1907), has been married 5 years, and is sterile. Periods irregular, but not painful. She had a curettage and dilatation one year before, but still has an acute anteflexion. Has a uterus that is apparently undeveloped, but a sound shows the uterine cavity to be over 3 inches in length. Her mother had 5 children, and her husband's mother had 6 children. Husband is very passionate, and she is quite so.

Examination 318.—2 hours after coitus and after 3 days' continence. Condom shows many lively spermatozoa.

Examination 319.—12 hours after coitus and

after 2 days' continence shows no spermatozoa in cervix.

Examination 320.—18 hours after coitus and after 2 days' continence shows no spermatozoa either in cervix or at fundus uteri.

Examination 321.—12 hours after coitus shows no spermatozoa anywhere in genitals.

Examination 322.—5 hours after coitus and after 1 week's continence shows no spermatozoa anywhere in genitals.

Two years later patient had not become gravid.

Examination 323.—4 hours after coitus and after 2 weeks' continence shows one live and many dead spermatozoa in interior of cervix.

Again, in 2 years (1911), in response to my letter, I am informed that patient never was gravid.

Examination 324.—10 hours after coitus and after 2 days' continence shows one dead spermatozoon in cervix and one dead one in vagina.

Mrs. T. K., has been married 6 years, and is sterile. Periods normal. Husband is normally passionate, but she not at all.

Examination 325.—1 hour after coitus and after 5 days' continence. Condom shows no spermatozoa.

Examination 326.—6 weeks later, 1 hour after coitus and after 12 days' continence. Condom shows no spermatozoa.

The husband was examined, and shows signs of an old double epididymitis.

Examination 327.—Aspiration of husband's

right testicle shows no spermatozoa and no fluid at all.

Examination 328.—Aspiration of left testicle shows same condition as the other.

Mrs. T. K., age 22 (1909), small and thin, has only been married one year and comes for sterility. Periods every 3 weeks and painful. Her mother had 9 children, and all of her married brothers and sisters have children. Husband's mother had 10 children, and all of husband's married brothers and sisters have children. Both are normally passionate. She has an acute anteflexion.

Examination 329.—2 hours after coitus and after 4 days' continence. Condom shows many lively spermatozoa. I performed a *Pryor* operation for her sterility, and patient became gravid and gave birth to a normal child.

Mrs. I. K., age 24 (1911), has been married 3 years, and is sterile. Periods normal. Husband is very passionate, but she is not at all. She has a very elongated cervix, with a minute os, a fibroid uterus, and a prolapsed left ovary.

Examination 330.—4 hours after coitus and after 2 days' continence. Condom shows very many spermatozoa, with straight tails, almost all dead, but a few feebly moving ones are seen. It was my impression that she allowed the condom to get frozen.

Examination 331.—2 hours after coitus shows live spermatozoa in cervical canal.

Mrs. B. K., age 26 (1911), has been married

9 years, and is sterile. She has severe dysmenorrhea. Both husband and wife are very passionate. She has an infantile uterus.

Examination 332.—2 hours after coitus and after 2 weeks' continence. Condom shows no spermatozoa.

The husband was then interviewed. He denies gonorrhea, but complains of premature ejaculation. On examination, his prostate and anterior urethra were found normal, but his testicles were undersized.

Mrs. E. L., age 25 (1911), has been married 2 years, and comes for sterility. Periods irregular and painful. Both husband and wife are very passionate, having coitus every night, but she complains that husband's semen runs out of her after coitus. She has an anteflexion and stenosis.

Examination 333.—1 hour after coitus and after 5 days' continence. Condom shows no spermatozoa.

Examination 334.—5 hours after coitus and after 10 days' continence. Condom shows no spermatozoa.

Examination 335.—4½ hours after coitus and after 5 days' continence, shows no spermatozoa anywhere in genitals. The husband has an undescended testicle.

Mrs. B. L., has been married 8 years (1911), and is sterile. Periods normal. Husband is not very passionate, but she is. She complains that

all the seminal fluid runs out of her after coitus. She has an infantile uterus.

Examination 336.—3 hours after coitus and after 2 weeks' continence, shows many lively spermatozoa in cervix and at fundus.

Mrs. R. L., age 39 (1906), has been married 8 years, and is sterile. She is very stout and of masculine type, having hair on abdomen up to umbilicus. Her mother had 4 children. Her husband is tall and well-built, and his mother had 6 children. Periods normal. Husband is very passionate, but sometimes has premature ejaculation. She is not at all passionate. She had a curettage 5 years ago. Examination shows that she is practically normal, except for a slight anteflexion.

Examination 337.—2 hours after coitus. Condom shows very many spermatozoa, most of which are dead, but some live ones are also seen.

Examination 338.—2½ hours after coitus shows live spermatozoa in cervix.

Examination 339.—4 hours after coitus shows live spermatozoa at fundus uteri.

Examination 340.—5½ hours after coitus shows many live spermatozoa in cervix.

Examination 341.—12 hours after coitus shows only 2 dead spermatozoa in cervix.

Examination 342.—5 hours after coitus shows only a few dead spermatozoa in cervix. This was 4 days after I had touched up the entire cervical canal with tincture of iodine.

Examination 343.—11 hours after coitus shows

very many live spermatozoa, but more dead ones within cervical canal.

Examination 344.—4 hours after coitus shows dead spermatozoa, with large heads, found in the cervical canal, and many live spermatozoa, with small heads, found at fundus.

One year later the patient wanted me to examine another condom specimen, which I did, although it was, of course, unnecessary.

Examination 345.—Condom shows live spermatozoa.

Mrs. B. P., age 22 (1912), has been married only 13 months, and comes for sterility. She had had at one time two months' amenorrhea, and at another time seven weeks' amenorrhea, followed by profuse menses. Periods otherwise every 4 weeks and very painful. Both she and her husband are very passionate. She has an acute anteflexion.

Examination 346.—9½ hours after coitus and after 2 days' continence, shows dead spermatozoa within the cervix, but no live ones.

In the following case an entirely new method of treatment was being tried, for what may be considered an absolutely hopeless case of sterility. Many experiments were made, but as there was no previous experience to go by, the right method had not yet been found at the time the patient ceased treatment. If I have an opportunity to continue these experiments on other patients I believe that I will finally be able to cure these cases, and I publish the results of my experiments thus far in

the hope that others will take up this line of research also and that they may thus be of service. At the worst, they do not interfere with the possibility of doing the more radical *Martin* operation for sterility later on, but the statistics of this operation are certainly very poor as to the final outcome.

Furthermore, if the successful method of procedure should be found as the result of many more such experiments, we will have achieved the very important practical result in the first place, and besides this there will be solved some of the most intricate and interesting questions in the physiology of conception as well as the effect of certain normal secretions upon the spermatozoon and the exact relationship of these secretions to conception.

Mrs. F. R., age 28 (1907), has been married 6 years, and is sterile. Periods every 3½ weeks and very painful. Her husband is very passionate, and she is fairly so. She has an acute anteflexion.

Examination 347.—4 hours after coitus and after 5 days' continence. Condom shows no spermatozoa.

Examination 348.—2 hours after coitus and after 4 days' continence. Condom shows no spermatozoa.

The husband was then interviewed and examined, and gives a history and also shows signs of an old double epididymitis of 5 years' standing.

Examination 349.—Prostatic secretion shows no spermatozoa.

I then treated his deep urethra and prostate by massage of the prostate and giving deep urethral instillations of weak silver nitrate solutions.

Examination 350.—1 week later and after 1 treatment. Prostatic secretion shows no spermatozoa.

Patient only continued treatment for two months.

Examination 351.—After 1 week's continence. Condom shows no spermatozoa.

Exactly 3 years later patient presented himself again for treatment. At this time (June, 1911) the examinations were as follows:

Examination 352.—4 hours after coitus and after 5 days' continence. Condom shows no spermatozoa.

Examination 353.—At same time as condom specimen. Aspiration of right testicle shows quite a few well-developed spermatozoa, with straight tails, in motion.

Examination 354.—At same time as previous examination. Aspiration of left testicle (which shows more thickening of epididymis than the right one) shows a large amount of fluid, but no spermatozoa.

Examination 355.—At same time as previous ones. Aspiration of thickened portion of left epididymis shows also fluid, but no spermatozoa.

The examination of the patient shows an en-

larged prostate (rectal examination), and an examination of the posterior urethra with the Wossidlo-Goldschmidt urethroscope shows a normal verumontanum. I then again started him on treatment of massage of the prostate and deep urethral instillations of silver nitrate. I did this because of the experience in another case, where I have seen the reappearance of spermatozoa after this treatment. The patient then received 9 treatments in 14 weeks, and then the result was as follows:

Examination 356.—After 3 days' continence. Condom shows one dead spermatozoon.

The patient then wanted something more radical, and I therefore tried the following plan of injecting the spermatozoa, which I aspirated from the testicle of the husband into the cervix and fundus uteri of his wife.

Examination (Experiment) 357.—6 days after coitus, and one day after close of menses, I injected the aspirated testicular fluid, mixed with a weak bicarbonate of sodium solution, into the cervical canal. The wife had her next period at the regular time.

Examination (Experiment) 358.—4 days after commencement of period, and 5 days after last coitus, I injected aspirated testicular fluid undiluted into the cervical canal of wife.

The wife had her next period at regular time.

Examination (Experiment) 359.—4 days after commencement of wife's period and 9 days after last coitus, I injected fluid obtained by aspirating

both testicles, undiluted, into the cervical canal of wife.

I then thought that some result might be obtained if the injections were made before the periods instead of after the periods, and that it might be advisable to inject with the testicular aspiration fluid the secretion of the prostate gland and seminal vesicles as obtained by massage of these parts per rectum.

Examination (Experiment) 360.—3 days before expected period and 8 days after last coitus, I injected the aspirated testicular fluid, plus the massaged prostatic fluid, into the cervix of wife. The wife had period 2 days after experiment.

Examination (Experiment) 361.—12 days after this period and 6 days after coitus made same experiment.

Examination (Experiment) 362.—2 weeks later did same experiment.

Patient then discontinued treatment.

Mrs. Y. S., age 23 (1911), has been married 2 years, and comes for sterility. Periods regular and painful. She complains that seminal fluid runs out after coitus. Both husband and wife are normally passionate. She has an acute anteflexion, with prolapse of both ovaries.

Examination 363.—4 hours after coitus and after 2 days' continence. Condom shows many lively spermatozoa.

Examination 364.—10 hours after coitus and

after 2 weeks' continence, shows many lively spermatozoa in cervix.

Mrs. M. S., age 30 (1908), has been married 7 years, and is sterile. Periods every 3½ weeks and very painful. She is small and stout. Her mother had 10 children, and she has two married brothers, who have children. Her husband is very passionate, and she slightly so. She has an infantile uterus.

Examination 365.—2 hours after coitus and after 4 days' continence. Condom shows many lively spermatozoa.

Examination 366.—Coitus, either 92 or 68 hours ago, shows many dead spermatozoa in cervix, some with half the tail off, but no live ones. Patient went to hospital, and at operation it was found that she had tubercular salpingitis, and she had both tubes removed.

Mrs. L. S., age 31 (1911), has been married 12 years, and is sterile. Periods normal. Both husband and wife are normally passionate. She has an anteflexion and stenosis.

Examination 367.—1 week's continence. Condom shows no spermatozoa. Previous examinations by other physicians also showed no spermatozoa.

Mrs. N. S., age 25 (1911), has been married 3 years, and is sterile. Periods normal. Seminal fluid runs out after coitus. She is very passionate, but husband has very little desire and is slightly impotent. She had a dilatation and curettage 4

months after marriage. She has a small anteflexed uterus.

Examination 368.—4 hours after coitus and after 6 days' continence. Condom shows many lively spermatozoa.

Examination 369.—10 hours after coitus, no spermatozoa found in genitals.

Examination 370.—½ hour after coitus shows numerous live spermatozoa in cervix.

I examined the husband and found an enlarged prostate. I treated him for his impotence, and in about 6 weeks his wife became gravid, but unfortunately aborted.

Mrs. B. S., age 25 (1911), has been married 7 years, and is sterile. Periods normal. She is normally passionate, but husband is almost impotent.

Examination 371.—3 hours after coitus and after 4 days' continence. Condom shows no spermatozoa. Husband was examined, and gave history and showed signs of an old double epididymitis.

Examination 372.—Aspiration of right testicle 3 hours after coitus shows no spermatozoa.

Examination 373.—3 weeks later, aspiration of left testicle shows no spermatozoa.

Mrs. E. S., age 24 (1911), has been married 6 years, and is sterile. Has had a dilatation and curettage 5 years ago. Periods are regular, but very painful. Her husband is very passionate, and has had 2 children by his first wife. She is

fairly passionate. She has a prolapse of left ovary.

Examination 374.—3 hours after coitus and after 3 days' continence, shows a few dead spermatozoa (with straight tails) within cervix.

Examination 375.—3 hours after coitus and after 5 days' continence. Condom shows many dead spermatozoa and only a few live ones.

Examination 376.—3 hours after coitus and after 5 days' continence, shows only a few dead spermatozoa in genitals.

Examination 377.—2½ hours after coitus, which was preceded by a phosphate of soda douche, shows many live spermatozoa in cervix and none in uterus.

Mrs. L. S., age 28 (1911), has been married 6 years, and is sterile. Periods normal. She is very stout. Neither husband nor wife are very passionate. She has an anteflexed undersized uterus.

Examination 378.—2 hours after coitus and after 4 days' continence. Condom shows many lively spermatozoa.

Mrs. B. S., age 21 (1911), has been married 4 years, and is sterile. Periods every 4 weeks, very scant and painful. She is not very passionate, and neither is her husband, who is somewhat impotent. She had a dilatation and curettage 9 months ago. Her uterus is small and retroflexed.

Examination 379.—1½ hours after coitus and after 8 days' continence, shows live spermatozoa

on external genitals, but only dead ones in cervix, and none in uterus.

I then ordered a phosphate of soda douche, to be taken before coitus, with the following result:

Examination 380.—10 hours after coitus shows many live spermatozoa in uterus.

Examination 381.—One year later. Patient did not use the alkaline douche. 67 hours after coitus shows many dead spermatozoa in cervix.

Mrs. S., has been married 18 months (1910), and comes for sterility. Periods regular and have been very painful the last few years. Both she and her husband are very passionate. She has an acute anteflexion and stenosis.

Examination 382.—4 hours after coitus and after one day's continence, shows a few dead spermatozoa, with straight tails, within cervix.

Pryor's operation for sterility was then done.

Examination 383.—1¼ hours after coitus shows a few dead spermatozoa on os, but none within cervix.

Examination 384.—Condom shows many spermatozoa, but almost all dead, many are misshapen, some with half the tail off, and some have one tail with two heads. There are also a few live spermatozoa present.

Examination 385.—10 hours after coitus and after 4 days' continence, shows only 1 dead spermatozoon in cervix.

Examination 386.—10 hours after coitus, shows no spermatozoa either in vagina or uterus.

Examination 387.—27 hours after coitus, shows no spermatozoa either in cervix or at fundus.

The husband was examined, and only showed an enlarged prostate. He had masturbated very much during the 4 years during which he had been engaged. I aspirated his testicle, with the following result:

Examination 388.—Two aspirations of left testicle showed no fluid at all and no spermatozoa.

Mrs. A. S., age 28 (1911), has been married 7 years, and is sterile. Periods normal. Seminal fluid runs out after coitus. Husband is very passionate, but she not at all. She has a submucous fibroid.

Examination 389.—1 hour after coitus. Condom shows many live spermatozoa.

Mrs. F. T., tall and stout, age 36 (1909), has been married 5½ years to her present husband, and 2 weeks to her first husband, and is sterile. Periods every 3½ weeks and very painful. Her mother has 8 children, and all her brothers and sisters have children. Her husband is very passionate, but she not at all. She has an infantile uterus.

Examination 390.—2 hours after coitus and after 17 days' continence. Condom shows many spermatozoa, almost all dead, with straight tails, but a few live ones are also present.

Examination 391.—17 hours after coitus shows no spermatozoa in cervix.

Examination 392.—After 5 days' continence

we find: At urethral meatus, dead, straight, large spermatozoa. At cervix, dead, straight and curved large spermatozoa. Deep in interior of cervical canal, very small live spermatozoa.

I then did a curettage and dilatation, with the result that at a later examination there was no anteflexion and uterus was larger.

Two years later patient was still sterile, and also had little or no sexual desire. She informed me that she had intense sexual desire during the two weeks she was married to her first husband, and then she was not married for 9 years, and at first had some sexual desire with her present husband, but this has been steadily diminishing.

Mrs. C. V., age 22 (1911), has been married 15 months, and comes for sterility. Periods normal. Husband is quite passionate, but she not at all. She complains that all her husband's semen runs out after coitus.

Examination 393.—2½ hours after coitus and after 5 days' continence. Condom shows many spermatozoa, but all dead.

Examination 394.—2 hours after coitus and after 2 days' continence, shows plenty of semen about cervix and in posterior vaginal fornix, although patient says it all ran out. Only dead spermatozoa found in vagina and in cervix.

Mrs. F. B., has been married 9 years (1911) and is sterile. She is 40 years old and very stout. Her husband is not very passionate, but she is.

She complains that the seminal fluid runs out after coitus. She has normal genitals.

Examination 395.—3 hours after coitus and after 4 days' continence, shows no spermatozoa anywhere in genitals.

Mrs. E. M., age 22 (1907), very stout, has been married 3 years, and is sterile. Periods normal, but rather scant. Has severe dyspareunia. Husband is quite passionate, but she not at all. She has a very small uterus.

Examination 396.—4 hours after coitus shows many spermatozoa in condom, but all dead.

Examination 397.—5 hours after coitus, shows many live spermatozoa in cervix.

Mrs. P. B., has been married 3 years and is sterile. Periods every 4 weeks and very painful. She is 22 years old. Her mother had 4 children; she has one married brother, whose wife is gravid. Husband's age, 30; he is normally passionate, but she not at all. She had a dilatation and curettage one year ago. She has a normal uterus, with straight, cervical canal.

Examination 398.—2 hours after coitus shows no spermatozoa in vaginal fornix, in cervix, or at fundus uteri.

Examination 399.—1½ hours after coitus and after 5 days' continence. Condom shows live spermatozoa.

Examination 400.—19 hours after coitus shows no spermatozoa in vagina or at cervix, which is protected by a thick plug of mucus.

Examination 401.—3 hours after coitus and after a phosphate of soda douche shows many dead spermatozoa in vagina, but none at cervix.

Examination 402.—60 hours after coitus, shows no spermatozoa at cervix.

Examination 403.—2½ hours after coitus and after a phosphate of soda douche, shows no spermatozoa either at cervix or fundus.

Mrs. B. M., age 23 (1911), has been married 4 years, and is sterile. Husband is passionate, but she not at all. She has a salpingo-oophoritis.

Examination 404.—3 hours after coitus and after 1 week's continence. Condom shows many lively spermatozoa.

Examination 405.—3 hours after coitus shows no spermatozoa in vagina and no spermatozoa either at os or within cervix. (She had *Dudley's* operation 6 months previous to above examination.)

Examination 406.—4 hours after coitus and after 2 days' continence shows no spermatozoa in genitals.

I examined her husband, and found his genitals normal.

Examination 407.—1½ hours after coitus, shows many live spermatozoa in interior of cervix.

Examination 408.—20 hours after coitus shows no spermatozoa in vagina, many dead spermatozoa in cervix, but live spermatozoa at fundus uteri.

Examination 409.—4 days after coitus and

after 2 days' continence, shows no spermatozoa in vagina and dead ones in cervix.

Mrs. G. F., age 24, has been married 5 years (1911), and had one 9-weeks' miscarriage brought on by herself 4 years ago, and has been sterile since. Periods normal. Neither she nor her husband are passionate. She has a prolapsed right ovary.

Examination 410.—4½ hours after coitus and after 6 days' continence. Condom shows many spermatozoa, mostly dead, but a few live ones are seen.

Patient complains that seminal fluid runs out after coitus.

Examination 411.—4 hours after coitus shows many live spermatozoa in cervix.

Patient then had *Dudley's* operation performed on her.

Examination 412.—3 months after above operation. 2½ hours after coitus and after 2 weeks' continence shows dead spermatozoa at vulva. In the posterior vaginal vault there is a pool of semen, containing many lively spermatozoa. Just within cervix, and also high up in cervix, we find many lively spermatozoa.

Examination 413.—27 hours after coitus, shows no spermatozoa in genitals.

Believing that the patient's stoutness might account for her sterility, I put her on thyroid extract (2½ grains) tablets with the following result:

1912

Jan. 2,	weight	138½,	pulse	88,	is	taking	4	tablets.
Jan. 8,	"	136¾,	"	93,	"	"	4	"
Jan. 10,	"	136¼,	"	110,	"	"	5	"
Jan. 17,	"	135¼,	"	88,	"	"	6	"
Jan. 20,	"	134,	"	91,	"	"	6	"
Jan. 24,	"	135,	"	88,	"	"	7	"
Jan. 29,	"	136½,	"	92,	"	"	8	"
Feb. 3,	"	133½,	"	88,	"	"	8	"
Feb. 17,	"	132½,	"	88,	"	"	8	"
Feb. 21,	"	131½,	"	80,	"	"	8	"
Feb. 24,	"	131¼,	"		"	"	9	"

Examination 414.—Jan. 13, 1912, 20 hours after coitus and after a phosphate of soda douche, shows many live spermatozoa just within cervix.

Examination 415.—Feb. 21, 65 hours after coitus, shows no spermatozoa in vagina, but many lively ones in cervix.

The following case illustrates how important it is to determine the condition of the male no matter what the previous history is.

Mrs. A. N., age 26 (1911), has been married 5½ years. She gave birth to a child 4 years ago, which only lived 2 days, and has been sterile since. Has had a curettage 2 years ago. Periods normal. Husband is normally passionate, but she not at all.

Examination 416.—4 hours after coitus, shows no spermatozoa, dead or alive, anywhere in genitals.

Examination 417.—4 hours after coitus and

after 5 days' continence. Condom shows absolutely no spermatozoa.

Examination 418.—After 5 days' continence, condom shows no spermatozoa.

After much questioning the patient then confessed that the baby she had 4 years ago was the result of a connection with the physician who treated her for sterility 1 year after her marriage.

One year later patient sent her husband for examination. He admitted a gonorrhea 8 years ago, but denied having had swollen testicles. Examination shows both testicles small; the right one is atrophic and the left one is small, with the epididymis thickened. Prostate is normal, but the left seminal vesicle is enlarged.

Examination 419.—2½ hours after coitus and after 2 weeks' continence. Condom shows no spermatozoa.

Examination 420.—At same time as condom examination. Aspiration of left testicle reveals much fluid, but no spermatozoa.

Examination 421.—6 days after coitus. Aspiration of right testicle shows no spermatozoa.

Examination 422.—At same time as previous examination, aspiration of left testicle shows no spermatozoa.

Mrs. L. L., age 24, has been married 2 years (1912), and comes for sterility. Periods every 3½ weeks and very painful. Dysmenorrhea only since marriage. She is very stout. Her husband

is very passionate, and she somewhat so. She has vaginismus, also a slightly anteflexed uterus.

Examination 423.—6 hours after coitus and after 2 days' continence. Condom shows very many spermatozoa, but all dead.

Examination 424.—14 hours after coitus and after 2 days' continence, shows no spermatozoa anywhere in genitals.

Examination 425.—17 hours after coitus, shows no spermatozoa either in vagina or cervix.

I requested another condom specimen, but it was never brought.

Mrs. J. G., age 22 (1912), has been married 23 months and comes for sterility. She had her first period at the age of 14½. Her periods were regular until she came to America at the age of 17; they then stayed away for an entire year and then came at irregular intervals of 2 or 3 months. Since her marriage she has only had 1 period, and that was 19 months ago. She was always very stout, but had been getting stouter of late until put on thyroid extract tablets at the clinic 2 months ago. Her weight now is 148½ pounds. Her periods were always painless. Her mother had 8 children. Her husband is fairly passionate, but she not at all. Examination shows a small infantile uterus, almost all cervix; the cervix is conical and projects about one inch into the vagina.

Examination 426.—2 hours after coitus and after 5 days' continence we find many dead spermatozoa in the vagina; just within cervix many

dead spermatozoa, but also many live ones; high up in cervix and at fundus uteri a few live ones are found.

The patient was put on thyroid extract tablets (2½ grains). Her weight, with all her clothes on, was, on January 10, 1912, 153¼ pounds.

1912	Weight	
Jan. 16,	153	Pulse 78, is taking 5 tablets a day.
" 20,	152	" 84, " " 6 " "
" 26,	149¼	Stopped thyroid for about 2 weeks and gave ovarian extract instead.
Feb. 5,	153¼	
" 8,	154	Stopped ovarian extract and gave thyroid tablets, one 3 times a day.
" 14,	153	is taking 4 tablets a day.
" 16,	152	" " 5 " "
" 20,	151¾	" " 6 " "
" 23,	150	" " 6 " "
" 29,	151½	" " 7 " "
Mar. 4,	152½	" " 8 " "
" 7,	150½	" " 8 " "
" 11,	150	" " 8 " "

Patient is still under observation, but thus far there has been no signs of the periods returning.

Examination 427.—Jan. 13, 1912, 41 hours after coitus, shows only one dead spermatozoon in the cervix and none at all at fundus.

Examination 428.—Jan. 26, 57 hours after coitus, shows no spermatozoa either in cervix or at fundus.

Examination 429.—Feb. 5, 12 hours after co-

itus and after 6 days' continence, shows many dead spermatozoa in vagina and live ones in cervix.

Examination 430.—Feb. 8, 60 hours after coitus, shows no spermatozoa either in vagina or in cervix.

Examination 431.—One day after coitus, shows no spermatozoa in vagina, but many lively ones in cervix.

Mrs. P. P., age 24 (1912), has been married 5 years and is sterile. Periods every 4 weeks and severe pain before commencement. She is short and stout; her mother had 8 children; all her married brothers and sisters have children. Husband is 28 years old, and his married brothers and sisters also have children. Both are very passionate. She complains that the seminal fluid runs out after coitus. Her pelvic organs are normal and she has an exceptionally well-developed posterior vaginal fornix.

Examination 432.—58 hours after coitus and after 2 days' continence shows no spermatozoa either in the vagina or in the cervix or at fundus.

Examination 433.—2½ hours after coitus and after 8 days' continence. Condom shows many live spermatozoa.

Examination 434.—27 hours after coitus and after a phosphate of soda douche, shows no spermatozoa either in cervix or at fundus.

Examination 435.—4½ hours after coitus, shows no spermatozoa in cervix.

Examination 436.—3 hours after coitus, shows no spermatozoa anywhere in genitals.

Mr. and Mrs. S. D. have been married 13 years (1911), and come for sterility. Her periods come every 4 weeks and are very painful. Neither are very passionate.

Examination 437.—One hour after coitus and after one week's continence. Condom shows no spermatozoa.

The husband was examined and shows a double old chronic epididymitis. The husband admits having had a gonorrhea 15 years ago, which was followed by a double epididymitis.

Examination 438.—3 weeks after coitus. Aspiration of right testicle brought out no fluid for examination.

Patient is being treated by massage of the prostate and deep urethral instillations of silver nitrate solutions, and is still under observation.

Examination 439.—Mrs. F. G., age 29 (1912), has been married 3½ years and is sterile. She contracted gonorrhea from her husband immediately after marriage. Periods every month and very painful. Had dilatation and curettage 2 years ago, but periods are just as bad. Her husband is very passionate, but she very little. She has a slightly anteflexed uterus with a marked left salpingo-oophoritis. No gonococci could be found anywhere in her genitals. Although patient was operated on for sterility no examination had been made of her husband's semen.

Examination 440.—4 hours after coitus and after 2 weeks' continence shows no spermatozoa either in vagina, cervix or fundus.

Examination 441.—5½ hours after coitus and after 3 days' continence. Condom shows no spermatozoa.

The husband was then examined and gave a history of gonorrhea 6 years ago, with swollen testicles. Examination shows a very enlarged prostate, very many large, infected follicles in the anterior urethra, hypospadias, and signs of old double epididymitis.

Mrs. F. H., has been married 8 years, and had a 7-months' miscarriage shortly after marriage, and has been sterile since. Both husband and wife normally passionate. This is her second husband; she had the miscarriage with her first husband, and has never been pregnant with second husband. She has a normal uterus, with a small fibroid nodule at right cornu of uterus. Has had a dilatation and curettage in July, 1910.

Examination 442.—6 hours after coitus and after 5 days' continence. Condom shows many spermatozoa, but all dead.

Examination 443.—6 hours after coitus and after 6 days' continence shows many dead spermatozoa in vagina, many live spermatozoa in cervical mucus, among which are a few atypical ones, such as one head with two tails. Within cervix, at angle of flexion, we find very many lively spermatozoa. The further in we get the livelier and

more numerous they become. At fundus we find lively spermatozoa.

Examination 444.—43 hours after coitus, no spermatozoa are found either in cervix or at fundus.

Examination 445.—41 hours after coitus and after a phosphate of soda douche, we find live spermatozoa in interior of cervix. In most cases only the head and adjoining part moves, while the rest of the tail is quiet. Fundus shows many very lively spermatozoa moving around as rapidly as in a condom specimen.

Examination 446.—106 hours after coitus (same coitus as last examination) shows no spermatozoa either in cervix or at fundus.

Examination 447.—66 hours after coitus and after two weeks' continence shows no spermatozoa either in vagina, cervix or fundus.

Examination 448.—36 hours after coitus and after 4 days' continence, shows no spermatozoa either in vagina, cervix or fundus.

Examination 449.—17 hours after coitus, shows same as previous examination.

Examination 450.—34 hours after coitus, shows no spermatozoa in cervix.

CHAPTER XVIII

Cases of Aspirations of Testicles.

I will now mention certain investigations I made concerning the presence or absence of spermatozoa in the testicles of the male obtained by aspirations of these organs. Most of these cases were taken from my genito-urinary clinic and they were not sterility cases. My investigations in sterility cases have already been mentioned in the following examinations in the histories just reported, namely, Examinations Nos. 40, 44, 45, 48, 49, 161, 198, 259, 265, 266, 287, 327, 328, 353, 354, 355, 357, 358, 359, 360, 361, 362, 372, 373, 388, 420, 421, 422, and 438. Besides the above, the following investigations were made on non-sterility cases:

Examination 451.—Case of chronic gonorrhea of five weeks' standing. Last coitus 6 weeks ago; no wet dreams. Aspiration of testicle shows a few motionless spermatozoa.

Examination 452.—Chronic gonorrhea with subacute epididymitis; last coitus 5 months ago; a wet dream 2 weeks ago. Many motionless spermatozoa found in testicle.

Examination 453.—Chronic gonorrhea of six

months' standing; coitus one week ago. No wet dreams. Enormous amount of motionless spermatozoa found in testicle.

Examination 454.—Acute gonorrhea, 3 weeks after coitus. Aspiration shows a large amount of serous fluid, but no spermatozoa. Patient's wife had given birth to two children.

Examination 455.—Sexual neurasthenic; coitus 5 days ago; a wet dream 2 days ago. Aspiration shows many motionless spermatozoa and also live, immature spermatozoa.

Examination 456.—Acute epididymitis; coitus 2 months ago. Aspiration shows no spermatozoa.

Examination 457.—Chronic gonorrhea of 9 months' duration; coitus 2 weeks ago; no wet dreams. Aspiration shows a few small, motionless spermatozoa.

Examination 458.—Chronic gonorrhea of 4 months' duration; coitus 2 weeks ago; has wet dreams 2 or 3 times a week. Aspiration shows very many large, motionless spermatozoa with straight tails.

Examination 459.—Inguinal adenitis and gonorrhea, 2 weeks after coitus. No spermatozoa found.

Examination 460.—Subacute gonorrhea 6 weeks old; coitus 8 weeks ago. No spermatozoa found.

Examination 461.—Syphilis 18 years ago and acute gonorrhea at present; no epididymitis. Has been married 11 years and his wife had one miscarriage 8 years ago, and has not been pregnant

since. Has a syphilitic testicle, which yielded to iodide of potassium. Aspiration of syphilitic testicle 4 days after coitus shows no spermatozoa.

Examination 462.—Same patient as above, 8 hours after coitus. Aspiration of other testicle also shows no spermatozoa.

Examination 463.—Sexual neurasthenic, age 23; impotent and loss of all sexual desire; never had any venereal disease. Last coitus 5 months ago; last wet dream 8 weeks ago. Aspiration shows a few motionless spermatozoa.

Examination 464.—Chronic gonorrhea of 4 years' duration; coitus 6 weeks ago. No spermatozoa found.

Examination 465.—Chronic gonorrhea of 1 year's duration; coitus 1 week ago. Aspiration shows a large amount of serous fluid, but no spermatozoa.

Examination 466.—Gonorrhea 6 weeks old; coitus 2½ weeks ago; wet dream 1 week ago. Aspiration shows many motionless spermatozoa and 1 lively one.

Examination 467.—Active secondary syphilis, with macular eruption all over body. No spermatozoa on aspiration.

Examination 468.—3 weeks after coitus reveals upon aspiration many motionless spermatozoa, and also immature spermatozoa. Addition of a 2½% carbolic acid solution enlivens the immature spermatozoa, but has no effect on the others.

Examination 469.—Acute gonorrhea with

chronic epididymitis; coitus previous night. No spermatozoa found.

Examination 470.—Mr. F., has double epididymitis (old) and condom never showed spermatozoa. Aspiration of testicle showed many motionless spermatozoa, and also a few live ones.

Examination 471.—Chronic gonorrhea, 2 weeks after coitus. No spermatozoa found on aspiration.

Examination 472.—Chronic gonorrhea, 3 months old, 3 months after coitus; last wet dream 1 month ago. Aspiration shows many motionless spermatozoa.

Examination 473.—Chronic gonorrhea; coitus 1 day ago. Aspiration shows live spermatozoa, and also some motionless ones. Prostatic fluid obtained from massaging his own prostate does not enliven the motionless spermatozoa.

Examination 474.—Chronic gonorrhea; wet dream 3 weeks ago. Aspiration shows many motionless spermatozoa with straight tails.

Examination 475.—Cured gonorrhea; married 3 years, no children; slight stricture in anterior urethra; coitus 1 week ago. Aspiration shows many live spermatozoa.

CHAPTER XIX

Various Statistics of Author's Cases.

SPERMATOZOA IN THE FEMALE GENITALS IN MY CASES.

Time After Coitus	Vagina			Cervix			Fundus		
	Live	Dead	None	Live	Dead	None	Live	Dead	None
Hours									
1	2		1	2	1	2			1
2		4	2	8	3	4	2		2
3	1	7	4	9	5	7	2	1	6
4		3	6	8	4	8	3	1	10
5			3	2	2	3			3
6		3		4	2		1	1	1
7				3	1	1	1		
8		1		1		1			
9					1				
10		1		2	4	1	1		
11				2	1				
12		1		3	1				1
15			5		1	11			4
20		1	4	2	5	6	2	1	3
Days									
1			1	1				1	1
2			6	3	1	10	1	1	6
3			3	2	2	4			2
4			2		2	4			3
5			1	1		1			1
6									1
7								1	

SPERMATOZOA IN THE FEMALE GENITALS IN MY CASES. (Continued.)

	VAGINA	CERVIX	FUNDUS	TOTAL
Live	3	53	13	69
Dead	21	36	7	64
None	38	63	45	146
Total	62	152	65	279

STATISTICS OF THE PRESENCE OR ABSENCE OF EFFLUVIUM SEMINIS IN NON-STERILE MARRIED WOMEN.

The 132 cases from which these statistics were made up were taken at random from the gynecological clinic of Mount Sinai Hospital Dispensary, service of *Dr. Sol. Wiener*. My original intention was to obtain an even 100 cases, but as I went along I discovered quite a few women who were in doubt as to the presence or absence of the condition. Most of these were old women who had not had coitus in years and could not remember what took place many years ago. I then did not interrogate the older women, but only those who still indulged in coitus. Here again I found women who could not answer the questions correctly because, in order to avoid impregnation, they allowed their husbands to practise withdrawal. I finally only questioned women who either were

only recently married, or only had a few children and did not care to prevent conception. This explanation is made to account for the many cases in which the patients had so few children. Without this explanation it might be thought that the condition of effluvium seminis (the running out of seminal fluid from the female genitals after coitus) was the cause of the small number of children in these women.

As stated on page 29, these investigations were undertaken to see what was the percentage of effluvium seminis in non-sterile women, inasmuch as *Runge* lays such great stress upon this condition as a cause of sterility, having found it present in over 79% of cases of sterility. The cases are arranged in alphabetical order, and the diagnoses were copied from the history cards.

EFFLUVIUM SEMINIS IN NON-STERILE WOMEN.

(YES means that seminal fluid runs out after coitus, NO that it does not, and ? means that they do not know.)

	Name	Number of Children	Diagnosis	Effluvium Seminis
1	R. A.	2	Chronic metritis	No
2	M. A.	6	Incomplete abortion	Yes
3	B. A.	3	Ovarian cyst	Yes
4	R. A.	2	Retroversion	Yes
5	L. A.	2	Cystocele	?
6	C. A.	2	Post ectopic	Yes
7	P. A.	1	Gravid	Yes
8	L. A.	2	Cystocele	No
9	A. A.	5	Eczema vulvi	Yes
10	A. B.	1	Endometritis	No
11	Y. B.	5	P. O. adhesions, Ventral suspension of uterus	Yes
12	R. B.	2	Bilateral diseased adnexa	Yes
13	I. B.	1	Ectopic	Yes
14	C. B.	4	Post-operative tubo-abortion	Yes
15	R. B.	5	Rectocele	?
16	I. B.	1	Eroded cervix	?
17	M. C.	7	Eroded cervix	Yes
18	A. C.	2	Negative	Yes
19	B. C.	2	Right adnexal disease	?
20	B. C.	6	Eroded cervix, left salp	Yes
21	L. D.	2 & 6 miscar.	Complete abortion	Yes
22	E. E.	4	Enteroptosis	?
23	I. E.	1	Constipation	Yes
24	B. E.	5	Gravid	No
25	S. F.	3	Hyper. cervix	No
26	D. F.	4	Negative	Yes
27	A. F.	1	Prolapsed right ovary	No
28	B. F.	3 & 1 miscar.	Lactation atrophy	No
29	S. F.	4	Negative	Yes
30	L. F.	4	Chronic metritis	Yes
31	J. F.	0 (is gravid)	Gravid	Yes
32	K. F.	1	Gonorrhea	Yes

EFFLUVIUM SEMINIS IN NON-STERILE WOMEN.—(Contd.)

	Name	Number of Children	Diagnosis	Effluvium Seminis
33	R. F.	0 (is gravid)	Gravid	Yes
34	S. F.	2	Pelvic exudate	?
35	G. C.	3	Lac. cervix and retrover	?
36	M. G.	2	Gravid	No
37	M. G.	0 (is gravid)	Gravid	Yes
38	B. G.	4	Endometritis	Yes
39	S. G.	2	P. O	?
40	Y. G.	5	Endometritis	No
41	B. G.	1	Endometritis	Yes
42	A. G.	1	Retroflexion	Yes
43	S. G.	4 & 3 miscar.	Negative	?
44	R. G.	6	Retroversion	?
45	R. G.	1	Hemorrhoids	Yes
46	M. G.	1	Endometritis	?
47	A. G.	1	Adherent retroversion	Yes
48	C. G.	2	P. O. adhesions	Yes
49	R. G.	2	Negative	Yes
50	S. G.	5	Negative	Yes
51	A. G.	1	Adherent retroflexion	Yes
52	C. G.	2	Endometritis	?
53	R. H.	2	Cystocele	Yes
54	J. H.	3	Ovarian cyst	Yes
55	S. H.	5	Cystocele, rectocele, lac. cerv.	Yes
56	M. H.	2	Parametritis	No
57	E. H.	6	Lues	Yes
58	L. I.	1	Gravid	Yes
59	R. J.	3	Negative	Yes
60	S. K.	6	Lac. cervix	Yes
61	R. K.	11	Retrover. and eroded cervix.	
62	M. K.	2 & 6 miscar.	Negative	Yes
63	H. K.	2	Endometritis	Yes
64	E. K.	11	Cystocele, rectocele, chronic metritis	Yes ?
65	E. K.	3	Fibroid	No
66	Mrs. K.	1 miscar.	Endometritis and prol. left ovary	Yes
67	D. L.	2	Atrophic uterus	?
68	M. L.	3	Rectocele and erod. cervix	?
69	J. L.	1	Negative	Yes
70	A. L.	11	Menopause	?
71	J. L.	4	Retroversion and parametritis	Yes
72	P. L.	3	Gravid	?
73	L. L.	2	Retroflexion	Yes

EFFLUVIUM SEMINIS IN NON-STERILE WOMEN.—(Contd.)

	Name	Number of Children	Diagnosis	Effluvium Seminis
74	E. L.	8	Cystocele, rectocele and eroded cervix	?
75	J. L.	4	Endomet. and erod. cerv.	Yes
76	R. L.	2	Negative	Yes
77	R. L.	16	Carcinoma uteri	No
78	J. L.	11	Negative	?
79	S. L.	1	Cystocele and rectocele	Yes
80	E. L.	3	Right salpingo-oophor	Yes
81	G. M.	1	Gravid	Yes
82	S. M.	2	Retroversion	Yes
83	F. M.	6	Cystocele and rectocele	Yes
84	A. Mc.	1	Incomplete abortion	Yes
85	M. M.	5	Eroded and lac. cervix	No
86	R. M.	3	Retroversion	?
87	M. M.	5 & 5 miscar.	Complete abortion	?
88	R. M.	4	Negative	?
89	S. M.	5	Submuc. fibroid	Yes
90	B. M.	1		Yes
91	S. N.	2	Gravid	Yes
92	J. N.	7	Cystocele and gravid	Yes
93	S. N.	1	Parametritis	Yes
94	N. O.	4	Negative	Yes
95	I. P.	3	Retroflexion	No
96	L. R.	3	Retroversion	Yes
97	T. R.	1	Lacerated cervix	Yes
98	F. R.	9	Chronic metritis and cystocele	?
99	I. R.	1	Ectopic	Yes
100	V. R.	2	Endometritis	Yes
101	R. R.	5	Gravid	Yes
102	M. R.	2	Gravid	Yes
103	S. R.	2	Anteflexion and stenosis	No
104	R. R.	1	Rectocele and cystocele	?
105	R. S.	3	Endometritis and cystic ovary	Yes
106	R. S.	8	Endometritis	Yes
107	C. S.	2	Cystocele, rectocele and retrov	Yes
108	P. S.	6 & 3 miscar.	Endometritis	Yes
109	R. K.	2	Left oophoritis	No
110	A. R.	5	Gravid	Yes
111	M. S.	3	Parametritis	Yes
112	R. S.	4	Fibroid	?
113	J. S.	2	Retroversion and prolapsed ovary	Yes

EFFLUVIUM SEMINIS IN NON-STERILE WOMEN.—(Contd.)

	Name	Number of Children	Diagnosis	Effluvium Seminis
114	S. S.	6	Floating kidney	Yes
115	F. S.	1	Gravid	Yes
116	F. S.	3	Gravid	Yes
117	G. S.	3	Gravid	No
118	B. S.	1	Adherent retroflexion	Yes
119	D. S.	3 & 1 miscar.	Salpingo-oophoritis	No
120	B. S.	5	Endometritis	No
121	B. S.	6	Gravid	No
122	M. S.	12	Cystocele, rectocele and paramet	Yes
123	Mrs. F.	2	Cystocele	Yes
124	R. S.	6	Hemorrhagic endometritis	Yes
125	D. W.	1	Lues	Yes
126	D. W.	5	Endometritis	Yes
127	M. W.	1	Adherent retroflexion	Yes
128	B. W.	4	Ectopic	Yes
129	A. Z.	1	Lac. perineum and retrover.	Yes
130	J. Z.	2	Right salpingo-oophor	Yes
131	R. Z.	1	Retroflexion	Yes
132	M. Z.	3	Chronic oophoritis	Yes

Doubtful cases, 25.
Seminal fluid runs out after coitus in 87 or 81 per cent.
Seminal fluid does not run out in 20 or 19 per cent.

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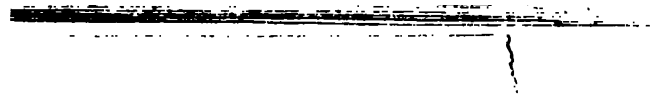

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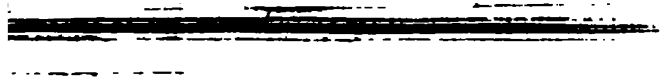

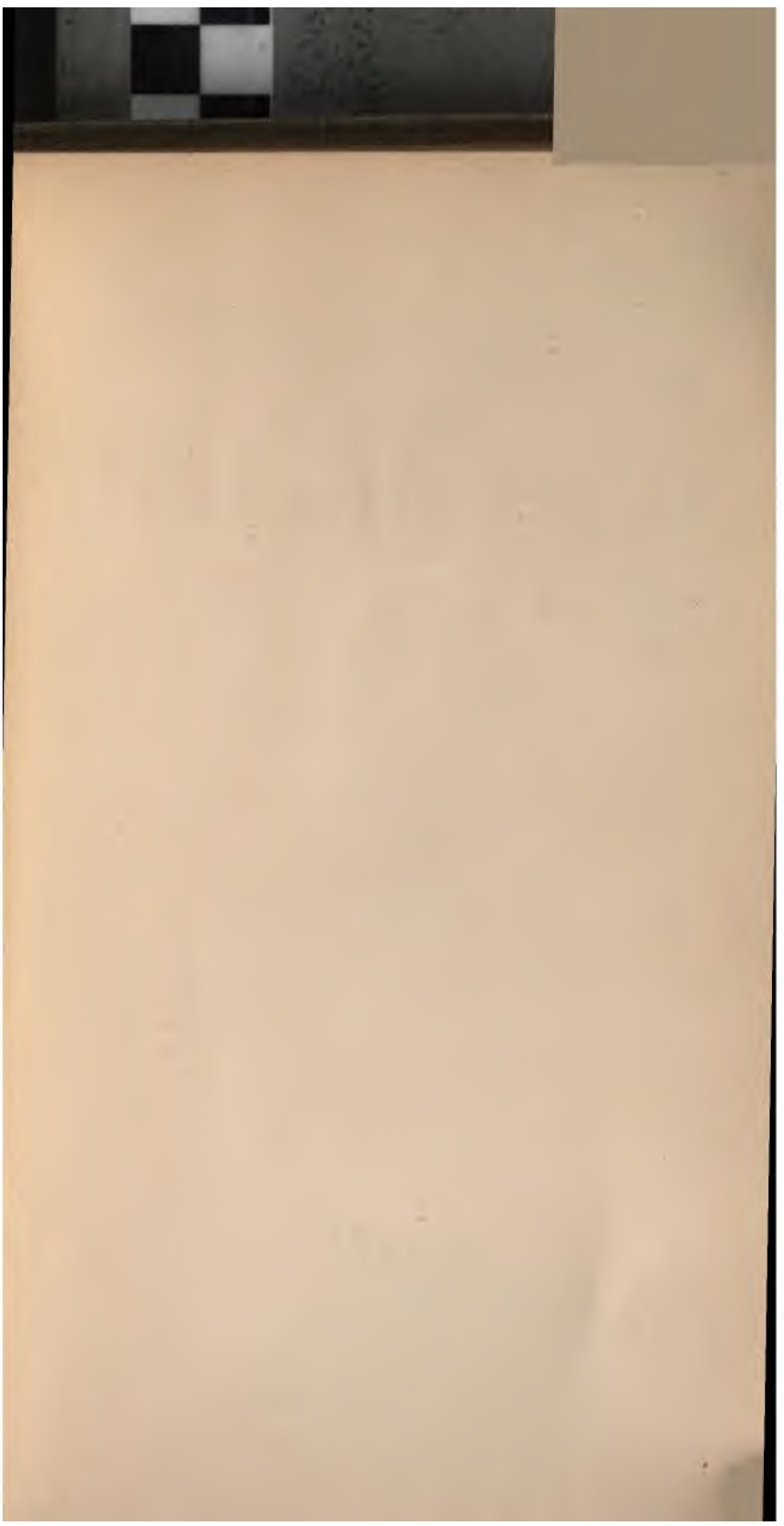

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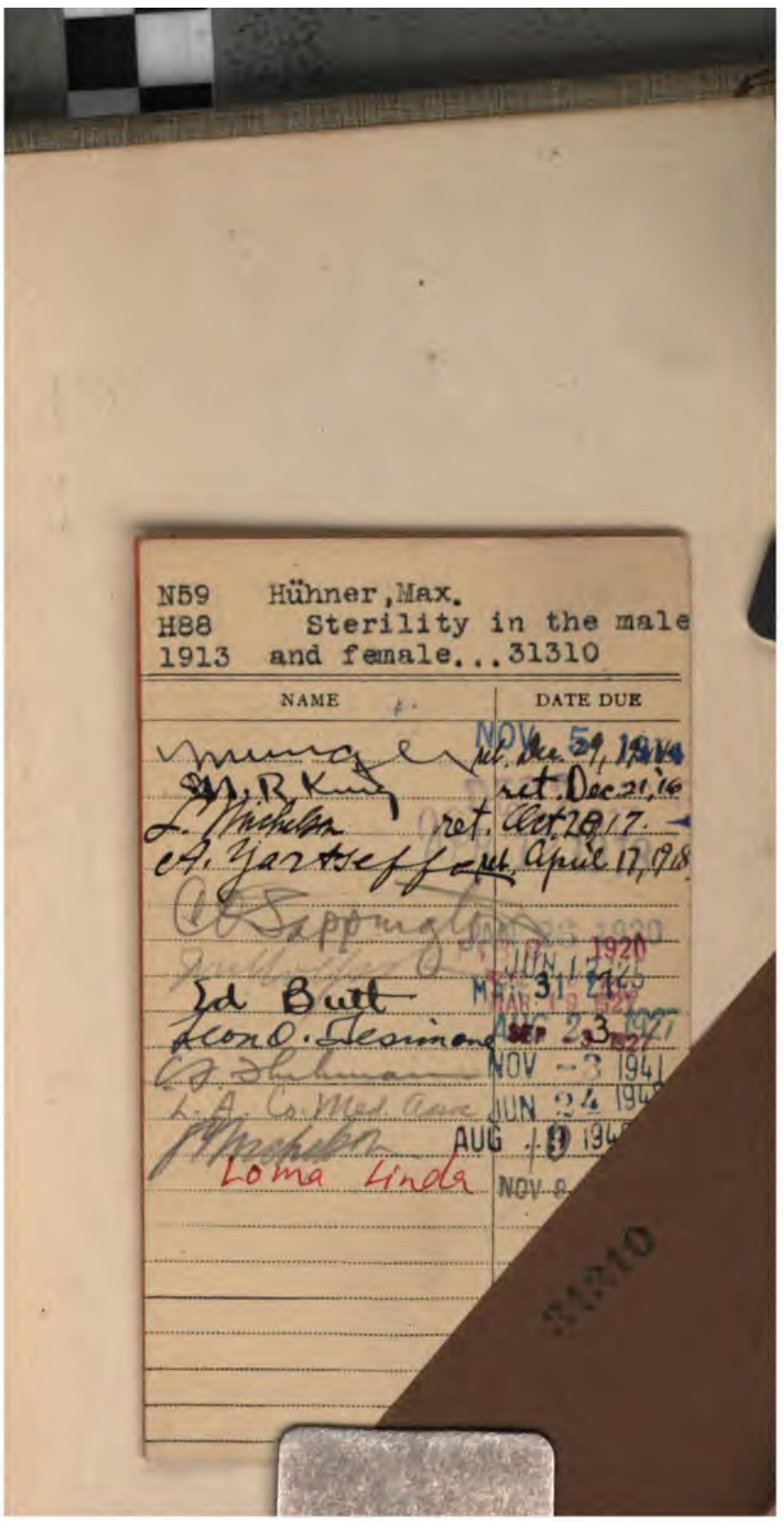

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